ELECTRICAL REVIEW

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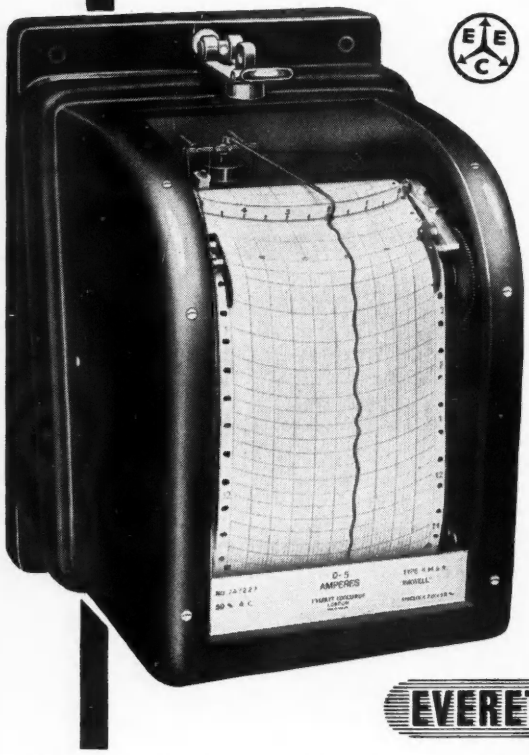

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ELECTRICAL REVIEW

Vol. CXLIX No. 3851 14TH SEPTEMBER, 1951

THE OLDEST ELECTRICAL PAPER • ESTABLISHED 1872

Drear Prospect

MEASURES TO AVOID OVERLOADING

THIS year the summer power cuts have prepared electricity consumers for something much worse during the coming winter and there is no doubt that severe weather will cause serious inconvenience, discomfort and loss. Everything possible has to be done to reduce this.

Industrial consumers must receive first consideration at a time when rearmament and export should be interfered with as little as possible. At the same time an attempt must be made to avoid the infliction of unbearable hardships upon domestic consumers. Thus in arriving at a compromise both types of consumers have to be asked to suffer in some degree—a degree depending largely upon the people themselves.

Load Spreading in Industry

Industry is the easier to tackle because it consists of larger identifiable units which can be dealt with by the Regional Boards for Industry. These Boards have made proposals, carrying some authority and approved by the Trades Union Congress, by which load can be " spread " to reduce the maximum demand by 20 or 25 per cent. Various methods of securing this spread have been suggested but all of them involve some disorganization and reorganization, affecting both employers and employed. The working of night shifts is the best way of meeting the requirements but it is feared that many of the workers—and their wives—are unfavourable to this plan. In any event higher rates of pay would be insisted upon (increasing costs already often too high) and questions of transport and catering would arise.

The possible alternatives to night work are double day shifts or an alteration of working hours. A substantial measure of " peak-lopping " could be achieved by the operation of private generating plant.

The Domestic Consumer

When it comes to dealing with the domestic consumer the only methods available are exhortation, to secure voluntary co-operation, or ruthless cutting-off. It is very difficult to persuade people to refrain from using electricity just when they ordinarily need it and (sad though it is) there must be a resort to warnings that failure to keep off the peak will mean summary deprivation. We still think that rationing, in the generally accepted sense, is impracticable.

It has been said before, but it must be repeated, that it is the lack of coal which is a prime cause of excessive electricity demand and consumption.

This is where power plant shortage and too little coal overlap and raise complications. It is this, too, which raises the question whether coal should be used for generating electricity instead of being burned otherwise, with ostensibly greater efficiency. This is a wide subject for separate discussion but we may hope that this consideration will not stand in the way of generating plant extension. Relief measures must be taken, but the demand for electricity will continue to grow and will have to be met.

HOME ACCIDENTS

The fourth summary of accidents in the home in 1950 which resulted in death from electric shock has been prepared by Mr. H. W. Swann for Home Office interdepartmental study. It records a total of 42 fatalities in that year. Three of them were due to electrically-operated tools, six to electric fires and another six occurred in bathrooms, seven were caused by faulty wiring, ten by irons, kettles, etc., while ten more are classed as miscellaneous. The figures are not very different from those of the previous year, but are comfortingly smaller than they used to be. In addition to direct fatalities, however, there were twenty-seven known cases in which death resulted from the ignition of clothing by contact with inadequately guarded electric radiators. The ratio of this kind of mishap to similar ones which are not fatal is not known, but 5 : 1 seems to be the lowest estimate.

MONOPOLIZED ELECTRICITY

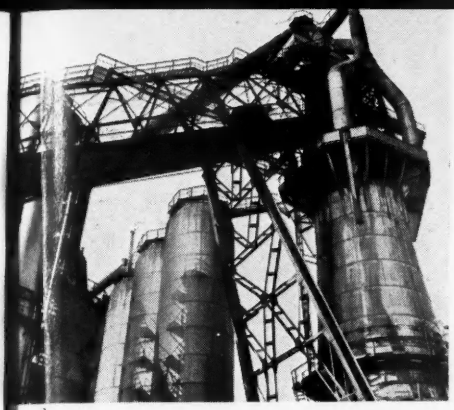
Aims of Industry, Ltd., has published a " non-party discussion pamphlet " on State monopolies which seeks to show that this form of organization is inimical to the public interest. Of electricity supply it says that in the first year of nationalization charges to consumers were increased by between 20 and 50 per cent, and that under the new control there have been power cuts which cost industry £10 million last year. The first statement is, of course, a gross exaggeration; the second places blame unfairly upon the British Electricity Authority. Even before nationalization electricity supply was a localized monopoly and about two-thirds of it was publicly owned. The proposed remedy for the ills attributed to the B.E.A. is the abolition of the Authority, the Electricity Boards and Consultative Councils and the granting of concessions to companies to operate the existing areas with separate concessions for generation and main transmission. The concessionaires would be subject to Government control, but it is maintained that " business management would be substituted for political management, and the role of the Government would be to guide—not to manage—the industries." This doesn't seem very different from the present arrangement.

PRICE AND SERVICE

Some attention is given in this issue to a statement on resale price maintenance presented to the Board of Trade by the British Refrigeration Association. The arguments put forward against any attempt to forbid such arrangements in the refrigeration industry are applicable to most other sections of the electrical industry. It is no reflection upon the general soundness of electrical equipment to say that it is of such a character that if anything goes wrong with it the sellers must be prepared to provide expert advice and service—if only to ensure that repairs are made safely. The reputable dealer does not disclaim all further responsibility when he sells an appliance, but he expects that the price paid will be sufficient to enable him to provide for future service. That is the main reason for price maintenance in the electrical industry and the Board of Trade should appreciate it.

RURAL COSTS

Meeting the demand from rural areas for a supply of electricity is a costly business and the return, with reasonable prices, is often too small to cover the charges. This point arises in the September " Report and News Letter " of the Friends of the Lake District. A great deal is said of the perversity of the North Western Electricity Board in maintaining that expenditure on underground lines is uneconomic. Even with overhead distribution the return is too small for the Board to cover its costs; underground distribution would set up an impossible situation. The report makes much of a fancied discrepancy between a figure of four times the " overhead " cost given for one district and between two and three times in another case. If a discrepancy exists at all the main argument remains undisturbed—that the extra cost of underground distribution is more than the Board can reasonably bear without financial aid from somewhere.



Each blast furnace installation includes the blast furnace proper (right), three heating stoves (centre), a dust catcher and two gas washing towers (left)

Pig Iron Production

New Blast Furnaces at Consett

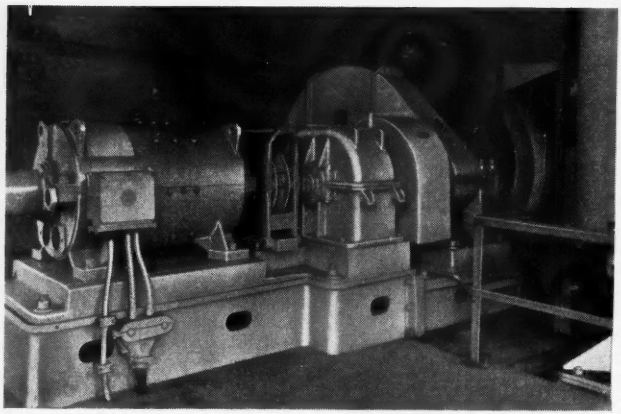
AN important section of the large reconstruction scheme at the Consett Works of the Consett Iron Co., Ltd. —the new power station and the additional coke oven battery of which were described in the *Electrical Review* of 10th August, and 7th September, respectively—is the new pig iron production plant which will include, when completed, three blast furnace installations, new pig iron casting equipment, and new electro-precipitation plant for the blast furnace gas cleaning.

One of the new blast furnace installations is now complete and in commission, and a second is well advanced. All three installations will be identical, so that it will be sufficient to refer to one only in this description. Each installation includes the blast furnace proper, a dust catcher, two gas washing towers and three heating stoves in which the blast air is preheated. The blast furnace proper, of all-steel construction, rises to a height of 180ft. It has three major sections from the hearth, near ground level, to the top, namely, the combustion zone which is brick-lined, the bosh and the stack. The diameter at the hearth level is about 20ft and the furnace tapers off slightly towards the top. The stack is riveted and there is a heavy fabricated lintel. Around the furnace top there is a platform and a superstructure above that embraces platforms and equipment for unloading the skips and the top gear equipment for operating the skips. The top equipment also includes small and large sealing bells by which the furnace is loaded.

The installation includes two skips by which the charging materials are carried to the furnace top on an inclined track, three scale cars from which the skips are fed and, of course, there is the necessary winch for hauling the skips. Ore preparation plant and ore and coke initial handling plant are also included in the scheme.

To outline the principle of modern blast furnace operation: the major charging materials are the ores, coke and limestone, with very large quantities of blast air required for combustion of the coke. The ores consist of oxides of iron which are reduced to metallic iron and CO_2 by the

The scale car is a travelling weighing machine which receives from the ore bunkers, etc., and delivers to the skips; note electrical recording panel (top centre)



The skips are hauled by a rope system which is operated by a 100 h.p. motor driven winch

ascending gas resulting from the combustion of the coke. The limestone is decomposed to lime and CO_2, and the lime fluxes the silica and other constituents of the ore and the ash of the coke to form a fusible slag which is drawn off. The CO and CO_2 and the nitrogen of the air, together with several hydrocarbons, constitute the blast furnace gas which is blown out of the furnace.

Ore from the works initial ore handling plant, coke from the coke oven installation and limestone are all received in the huge elevated concrete bunkers which serve and are adjacent to the blast furnace installations. The ore from the bunkers is gravity fed out into scale cars, the automatic gates at the bottom of the bunkers being opened by compressed air supplied from a 10 h.p. B.T.H. motor driven air compressor actually mounted on the scale car. Each of the three scale cars is a travelling weighing machine which runs on a track. The car is so positioned that it is fed directly from the bunkers and feeds directly to the skips.

The scale car is driven by a 35 h.p. d.c. traction B.T.H. motor which is served by a plain forward and reverse drum type controller. A bare conductor overhead system with a sliding contact gear provides the required flexibility for the electricity distribution to the car motor. The scale car is actually the means of mixing the ores according to the type of burden wanted in the furnace, i.e., the type of iron to be produced, and this mixing is effected by the scale car operator who takes his loads from predetermined bunkers which contain different types of ores. While his scale car is receiving a load from the bunkers the operator faces a panel which provides an electrical recording of what passes into the furnace.

Materials from the scale car are gravity fed into the skip below, and it should be made clear that the same skips and scale cars are used for all the materials, i.e., ore, coke and limestone. The maximum skip load is 3,500 lb. The skips run on wheels on an inclined track up to the furnace top by means of a rope haulage system, partly balanced, one up and one down, under the control of the specially designed skip winch. This is driven by an English Electric 100 h.p., 415 r.p.m. d.c. motor which is controlled by a contactor panel through a bank of resistances which are cut out progressively for motor speed increase. At a predetermined point on the skip a screw down limit switch on the skip " engine " introduces resistances which reduce the motor speed to a very low figure. Between the motor and the reduction gear is a magnetic brake, and then the transmission is continued to the winch drum by pinion gearing.

At the furnace top the skip is mechanically tipped on to the small or upper sealing bell of the furnace, and the load is first received by an automatically operated 2 h.p. motor driven McKee revolving distributor. The charging operations, which are completely automatic throughout a cycle, are initiated by the scale car operator who can also, if necessary, effect the various movements by hand control from push-buttons on the panel mentioned, which also shows, *inter alia*, the progress of the cycle, the positions of the bells and distributor, and the depth of the stock line.

Each charging cycle provides 10 skip loads of ore and coke, and the cycle is in two sections arranged in sequence order thus: first section (5 skips) O-C-O-C-O, and second section C-O-C-O-C. The bells are

After pouring, the tapping hole is plugged by a two-motor clay gun

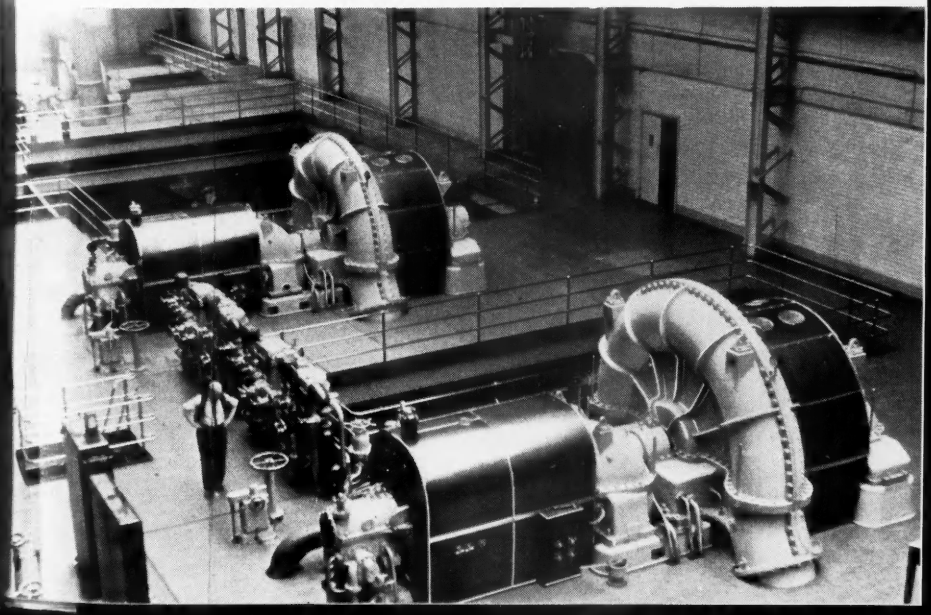
operated from pneumatic equipment in the skip room, which is also controlled from the panel near the scale car. The first or smaller upper bell lifts and thus feeds the material on to the larger or second bell while this is closed, and the second bell is opened to feed the charge to the furnace proper after the first bell is reclosed.

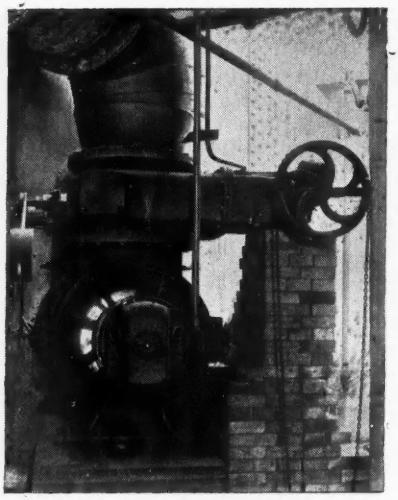
The flow-line actually inside the furnace proper is obvious from our earlier comments on the principle of operation, and it is sufficient to say here that while the materials get increasingly hotter as they flow down the furnace little change takes place in them, particularly the coke, until they reach the combustion zone.

Molten iron is poured from the furnace at the hearth level at about every four hours, and it runs out of the tap hole in the furnace wall, the hole being sealed with clay at non-pouring times. The sealing of the hole is an interesting electrical application. The nine cubic feet of clay required for the plug is applied by a two-motor operated gun. The motors are 20 h.p. each and one serves for ramming while the other provides for slewing of the bracket suspended unit. The gun is charged with clay by hand and directed into the tap hole by means of the 20 h.p. slewing motor; then the actual ramming is done by the 20 h.p. ramming motor.

Both of these B.T.H. gun motors are housed on the gun itself, and they are controlled by plain forward and reverse equipments in the nearby control and

Blast air is provided by two turbo-blowers installed in the power station





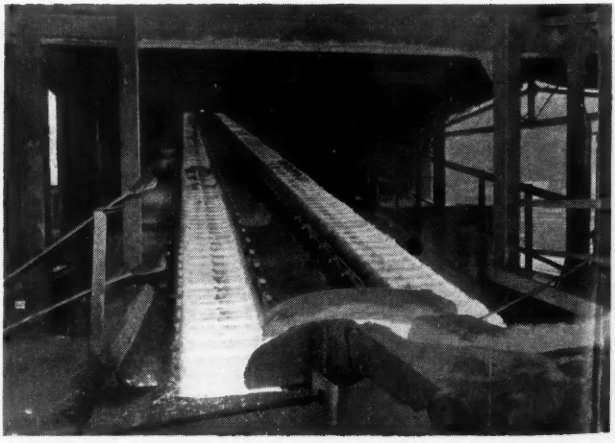
Air is blown in with gas into each regenerative stove by a motor driven fan

observation room. In the furnace are also two slag notches from which the slag is drawn off at intervals between the pouring operations. These notches are hand plugged.

Blast air required for the combustion of the coke in the furnace proper is provided by turbo-blowers in the power station (*Electrical Review*, 10th August) and there are 12 tuyeres or nozzles in the combustion chamber wall for this purpose, but first the air is passed through the stoves where it is heated in checker brickwork on the regenerative principle. The brickwork is the essential part of the combustion chamber of each regenerative stove, and it is first heated by burning coke oven gas in it for about two hours. After this period the firing is stopped and the blast air is passed through the brickwork to be preheated. The waste gases travel up the combustion chamber over the top of the internal structure of the stove and down the checker brickwork, imparting their heat on the way out to the flues and chimney. Air is blown in with the gas by means of a directly driven B.T.H. 14 to 22 h.p., 2,800/3,250 r.p.m. d.c. motor driven fan. The motor is controlled by Wilfred Francis contactor panels which have raise and lower speed features, so that the gas pressure may be increased or decreased to requirements. The temperature of the blast is regulated by a butterfly valve which allows a certain amount of cold blast air to by-pass the stoves and mix with the hot blast from the stoves before reaching the furnace proper. The gases are blown off from the blast furnace into the dust catcher in the conical bottom of which the dust settles, to be drawn off into trucks for removal. From the dust catcher the gas passes through the washing towers and finally to the gas cleaning plant.

Cooling of the furnaces is of outstanding importance. The hearth and bosh receive their cooling water by gravity from an elevated reservoir, aided by a directly coupled centrifugal pump driven by a Mather & Platt 135 h.p., 1,460 r.p.m. motor which is controlled by a Reyrolle circuit breaker. The four of these motor driven pumps include one for each furnace and one as stand-by. A part of this water, after cooling the hearth and bosh, is

The casting is carried out in continuous conveyor type strands



recirculated round the stack by means of a 22 h.p. B.T.H. motor driven pump. The hearth is cooled around its complete circumference via stall coolers, the bosh and stack cooling media are plate coolers, while the tuyeres are fed from a separate ring main on the furnace. All the vital parts of the system can be transferred to the town water supply in an emergency.

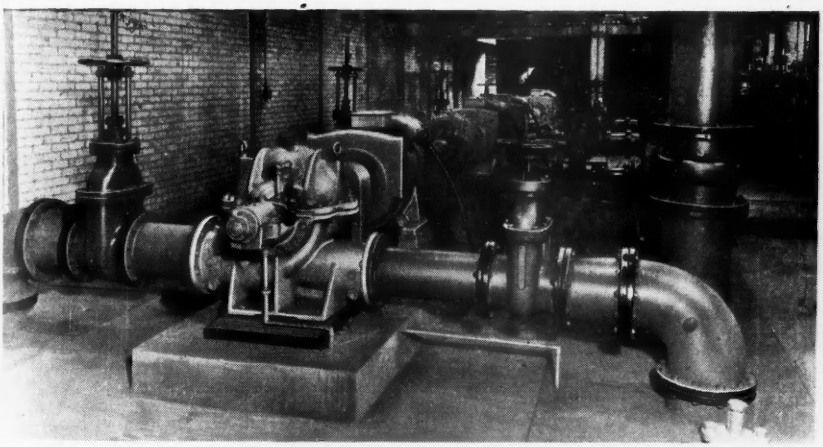
When the tapping hole in the blast furnace is unsealed the molten metal is allowed to run down into a 90 ton ladle which is handled by an overhead crane. This crane is equipped with English Electric motors for the various motions as follows: main hoist, 135 h.p.; auxiliary hoist, 135 h.p.; main cross travel, 25 h.p.; auxiliary cross travel, 15 h.p.; long travel, 135 h.p.

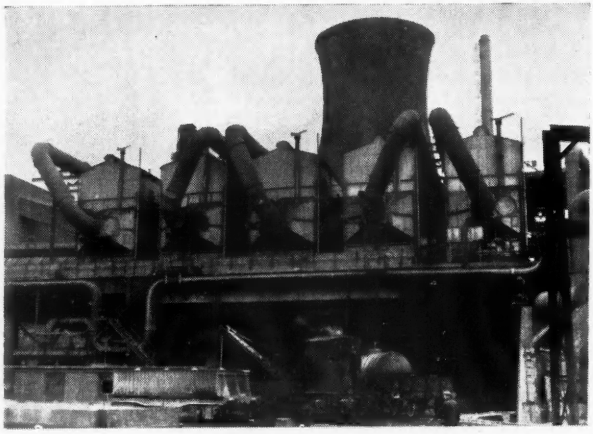
The filled ladle is transferred to the casting house where there are two casting strands, i.e., lines of moulds built up as continuous chain conveyors. Each strand is 150ft long, single length, about 1ft wide, and it contains 320 casting pans in its overall length. The strand is slightly inclined and is water sprayed for cooling the castings. Pouring takes place into both strands whilst they are in motion, the metal running into the strands via a bifurcation of a main sand channel which is served by the 90 ton crane after it has been set in its " holding " structure and tilted by a smaller crane. The strands are each driven by a 7/20 h.p., 500 V d.c. Metrovick motor which has a speed range of 385/1,155 r.p.m. under the control of Brookhirst contactor starters. By the time the moulds reach the far end their contents are cast solid and the castings here fall out of the moulds ready to be picked up and transported to stocking rounds ready for despatch or handling to the steel melting shops at Consett.

In dealing with the blast furnace gas stream we have already referred to the uses of the dust catcher and the washing towers at the blast furnace installations. Low pressure water is passed to a ring main at the top of the towers for scrubbing the gas in the towers. The pumps for this service are four 130 h.p. Worthington Simpson motor driven units which deliver 2,900 gal/min at 60 lb/sq in. The water is ejected into the towers at various points through sprays for washing the gas which is passing through from the dust catcher. For washing down the scrubbers at frequent intervals at 200 lb/sq in there are also two 20 h.p. W. S. pumps which take their supplies from the low pressure delivery line and feed into the towers through self-cleaning strainers.

The slurry from the towers is passed into settling tanks, in each of which a revolving agitator directs the slurry to the tank centre from which it is removed by two diaphragm pumps, each of which is driven by a 12½ h.p. Brook motor. The water from each tank flows into a launder round the top of the tank from which it passes

Four 130 h.p. pumps provide the low pressure system of water scrubbing in the washing towers





The semi-cleaned gas from the blast furnace installations is treated in five electrostatic precipitators

down to a sump whence it is pumped up to a cooling tower by four Harland Engineering 115 h.p., 1,470 r.p.m. directly coupled centrifugal pumps. The cooled water from the ponds falls to the low pressure pumps serving the washing towers.

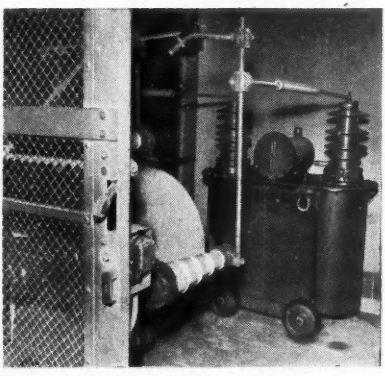
The semi-cleaned gas from the blast furnace installations is passed on to an installation of five electrostatic precipitators, three of which are normally in service at one time and will handle overall 9 million cu ft of gas/hr. In this Lodge-Cottrell installation the electrodes are charged with rectified a.c. at up to 100 kV from disc type rectifiers, each of which is supplied from its own 500 V/100 kV transformer.

The solid matter collected on the electrodes is washed off every four hours, the electrodes themselves being actually subjected to water sprays for this purpose. There is, of course, interlocking between the various relevant plant components to prevent washing when the electrode system is " alive."

The pumping plant for the electrode washing is similar to that of the high pressure scheme for the scrubbing towers. The cleaned gas from the precipitation plant is passed on to the consumers, namely, the coke ovens, melting shop, plate mills, angle mills and the power station, either directly or via a waterless gas holder which has a capacity of 2 million cu ft and maintains a gas pressure of about 10 inches water gauge.

We are indebted to Mr. H. Boot, managing director, Consett Iron Co., Ltd., for permission to visit the installations in question and to publish this article, and to Mr. F. B. George, director and works manager (development), and Mr. T. Coxon, consulting electrical engineer, for their help in obtaining the information and illustrations.

The precipitator electrodes are charged at 100 kV from disc type rectifiers



Sunderland Transport Report

THE annual report of the Sunderland Corporation transport manager (Mr. H. W. Snowball) states that the Department's gross profit at £34,211 was £21,839 less than the previous year's, but the results were not as bad as expected owing to economies which had been made. The total income was £568,212, a decrease of £6,053, while expenses at £534,001 were £15,786 higher. During the year the trams carried 44·1 million passengers. There are 24½ miles of tram route in operation and 90 trams and 113 buses in stock.

VIEWS on the NEWS

By REFLECTOR

IN a playful way, but with a serious undertone, a "fourth leader" in *The Times* last week dealt with some advice to housewives given by "an impressive body called the Midlands Electricity Peak Economy Committee." The suggestions made by this Committee include the postponement of some housework until the evening and slow cooking during peak periods: stews, it says, are ideal. It is impossible not to sympathize with the writer and also the unfortunate housewife, although the clamant need for keeping off the peak is recognized. It is most exasperating for women to have to turn their arrangements upside down. Have we really reached the position when, as the writer says, we have to train men and women to eat when there is sufficient electricity instead of when they are hungry or to "eat what the grid will stand"?

* * *

On the subject of load shedding, I heard it said at an Electricity Consultative Council meeting last week that there were between 2,000 and 3,000 technical engineers whose time was taken up in organizing power cuts. I don't know how this estimate was arrived at, but the implication that these engineers are solely devoted to load shedding is, I am sure, incorrect. No doubt a great deal of additional work is entailed and when the country's plant capacity becomes adequate to its needs the engineers will themselves "shed" a very onerous load.

* * *

A warning against "complacency" regarding the B.E.A.'s intentions in North Wales has been sounded by the Council for the Preservation of Rural Wales. There is no reason to hope, it says, that the schemes will not go through and the Hydro-Electric Protection Committee intends to fight the proposals "all along the line." On the other hand, a correspondent to the *Chester Chronicle* suggests that the schemes are worth carrying out and will not disfigure the landscape. He goes so far as to say that "sometimes we cannot but feel thankful that the C.P.R.W. and its friends did not exist when Telford and Stephenson were designing and erecting their monumental embankments and bridges over the Conway and Menai for it is easily conjecturable that they would have opposed the building of the great transport links in our communication lines."

* * *

In past months I have complained about the number and length of speeches at some electrical functions, but they are as nothing compared with the spate of oratory which distinguished earlier electrical gatherings. For instance, Mr. W. A. Gazard mentions in the September *Electrical Contractor* that at the annual dinner of the Electrical Contractors' Association in 1905 (the year of Mr. W. R. Rawlings' first presidency) there were seven toasts and nine responses. Moreover, the dinners themselves were then on a scale unknown to the present generation and there were also "vocal items." The dinner must have finished about breakfast time.

* * *

References to some of the speeches were made in a leader in the *Electrical Review* of 7th July, 1905. The writer took a grim view of some remarks by Mr. G. L. (later Sir Laurence) Gomme, the Clerk to the London County Council, in which he sought to justify the entry of the L.C.C. into electrical contracting—surely one of the earliest manifestations of municipal competition in this field. It was thought that "coming from one who holds such an important position . . . such a remark cannot be treated with the derision it deserves." Another speaker, the Mayor of Shoreditch, said that his borough had abandoned municipal wiring. This was understandable: the leader writer says that "at Shoreditch the work put into the Mayor's own premises—and, of course, only the very best hands would be employed on the Mayor's own premises—was so bad that a fire resulted!" Is this a warning to Electricity Board chairmen?

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents.

Load Limiting

YOUR correspondent Mr. Bennett (24th August) describes a method of load limiting by the insertion of a resistance in series with the load and suggests that such a method could be applied to residential estates by fitting the device in feeder pillars.

Apart from the difficulty of easily accommodating a resistance large enough to dissipate the energy involved in dropping the voltage sufficiently to cause the consumer to reduce his load, we would surely be " cutting off our nose to spite our face " if we were to waste this energy merely to limit the load.

A simple numerical example will show quite clearly that although the load on the system is reduced, a large proportion of energy will be wasted in heating up the street box, for which the Board would receive no revenue whatsoever.

Surely a most uneconomical method of achieving control; the object is to supply electricity, not throw it away!

Braintree, Essex. J. R. KNOWLES.

Expensive Tendering

WITHIN the last few days I have seen a general outline and specification issued by the Leeds Regional Hospital Board in connection with some electrical work required at the Bingley and District Hospital and am particularly interested in three rather unusual clauses.

Clause 50 says:—" The tenderer is required to design the scheme to comply with the requirements specified hereafter. No allowance will be made by the employers to the contractor tendering for costs incurred in the preparation of the schemes and tenders."

Clause 51 says:—" A print from Drawing No. 17/3/1414E showing plan and elevation of the structural alterations to be carried out in the theatre suite and out-patients' clinic is supplied with this specification to assist the contractors tendering to design their schemes."

Clause 52 says:—" The contractor is required to supply with his tender a drawing or drawings showing the details of all lighting points, switch and socket outlet positions, fan controls, emergency lighting points, sterilizer controls, etc., and also detailed specification of the materials and equipment included. Upon acceptance of the tender the successful tenderer will be required to supply six copies of his drawings, and any additional drawings which may be required to give details of incidental builders' work. On completion of the contract the contractor will be required to supply a set of linen negatives giving full details of conduit runs and of the installation ' as fixed '."

I am now wondering how many contractors will go to the trouble of doing the work of the Hospital Board's architect or consultant, how many different schemes will be submitted and how the Board will decide which is the best.

If forty or fifty firms apply for the document and tender for the work how many man-hours will be wasted by drawing office staffs producing the drawings asked for by the Board? How much will the materials and equipment specifications vary?

Personally, I hope electrical contractors will refuse to comply with this latest imposition.

Bradford. HARRY MOSS, M.I.E.E., F.I.E.S.

Wood Pole 132 kV Line

IN connection with the decision of the British Electricity Authority to erect a section of 132 kV transmission line on wood poles (*Electrical Review*, 22nd June, p. 1301), your readers may be interested to hear of experience with similar lines in Poland. I was employed from the middle of 1927 to the outbreak of war in 1939, first as engineer, chief engineer in 1930 and finally as managing director, by a company which operated approximately 150 miles of overhead transmission lines of the " H " type,

using creosote impregnated pine poles with double steel channel cross-arms.

The conductor spacing was suitable for 110 kV, but the lines were operated at 66 kV. The insulator strings consisted of two units of solid type suspension insulator as shown in Fig. 1. The neutral of the system was earthed through arc suppression coils. The first section of 50 miles was put into service in November, 1927, and a further section of 80 miles in May, 1928. Some additions were made at a later date. The reason for the adoption of such a design was economy, wood poles 45–70ft long being available at an attractive price.

The impulse flashover of a 40ft wood pole is approximately 5,000 kV. The lines were therefore extremely highly insulated in comparison with the insulation level of switchgear and transformers. No lightning arrestors were provided. As a result in the initial stage we experienced a good many flashovers in the substations, resulting in damage to some bushings, especially on oil circuit breakers, which were of the compound filled type. In order to prevent flashovers in the substations the insulation level of the approach lines on the last half mile was reduced. This was achieved by earthing cross-arms and providing grading rings on the insulator strings, thus co-ordinating the impulse flashover of the approach lines with the insulation level of the switchgear and transformers. The measures adopted proved very effective.

In spite of the extremely high impulse level of the lines we experienced a considerable number of direct lightning strokes, affecting single conductors, and also two and three conductors. In the case of single conductor strokes, the continuity of service was not interrupted because the arc suppression coils proved to be very effective. Flashovers on more than one conductor resulted in the tripping of circuit breakers. Flashovers usually did not damage the overhead transmission line to such an extent that further operation was impossible, and auto-reclosing was adopted wherever practicable. Lightning discharges broke a good many insulator sheds and many wood poles were damaged. It is remarkable that we had very few breakages of insulator stems resulting in dropping of the conductor. In the event of breakage of an insulator we kept the line alive until stand-by plant was brought into commission and the line could be permanently repaired.

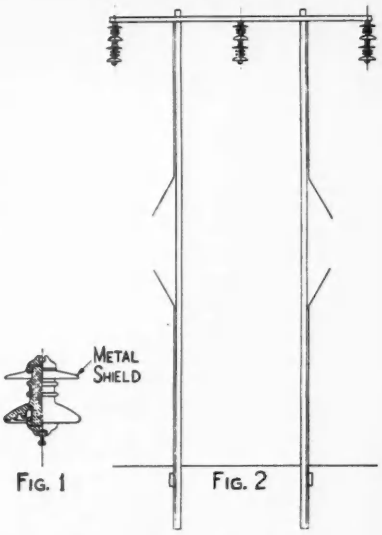


FIG. 1 FIG. 2

Temporary repairs were carried out on live lines. Most of the lines run through sparsely populated areas. The land owners were informed of precautionary measures which were to be adopted in the event of a fault and premiums were paid for prompt information of the site where damage had occurred. In 12 years we did not have a single accident to any person on this account.

Lightning discharges along the wood poles usually caused splintering. The lines were inspected at regular intervals. The damaged poles were treated with creosote. We later fitted spark gaps, as shown in Fig. 2, on the splintered poles to avoid further damage.

In view of operating experience it was decided: (i) To adopt wood cross-arms on future lines. (ii) To use only a portion of the wood to increase the impulse insulation level of the lines. (iii) To protect the wood by suitable spark gaps. (iv) To provide shielding on the approach lines. (v) To reduce the insulation level of the approach lines. (vi) To adopt a more common type of suspension type insulator instead of the solid stem type.

A section of line incorporating the majority of the above features was under construction when the war broke out.

S. E. GIESZCZYKIEWICZ,
Calcutta, 1. M.Amer.I.E.E., A.M.I.E.E.

PERSONAL and SOCIAL

News of Men and Women of the Industry

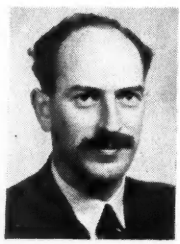
THE Merseyside and North Wales Electricity Board has appointed **Mr. K. Helliwell,** A.M.I.E.E., and **Mr. G. Faraday Davies,** M.I.E.E., as sub-area engineers of Nos. 1 and 4/5 Sub-Areas respectively.

Mr. Helliwell holds the position of senior assistant engineer (planning and operation) in No. 1 Sub-Area. Previously he served with the North Western Electricity Board as mains engineer and before vesting date he held appointments with the Preston, Luton, Lincoln, Bradford and Darwen electricity undertakings. He will succeed **Mr. E. L. Morland,** M.B.E., M.I.E.E., the present engineer of No. 1 Sub-Area, on his retirement. Mr. Morland entered the electricity supply industry in 1900 with the Liverpool Electricity Department. In 1928 he was appointed superintending engineer of distribution with that undertaking and held this post until he was appointed to his present position on vesting day.

Mr. Faraday Davies, who is at present deputy sub-area engineer of No. 4/5 Sub-Area, was formerly assistant transmission engineer with the late North Wales Power Co., Ltd., an appointment which he held since 1925. Before that he was with the South Wales Electric Power & Distribution Co. from 1913, except for a period of war service when he held a commission in the Royal Engineers.

Mr. A. N. Mansfield, M.I.E.E., the present engineer of No. 4/5 Sub-Area, who is shortly due to retire, was previously the chief transmission engineer of the former North Wales Power Co., Ltd.

As from 1st August last, **Mr. G. B. Hayward,** A.M.I.E.E., has been appointed manager of the Plymouth sub-office of the Metropolitan - Vickers Electrical Co., Ltd., in succession to **Mr. W. S. Livsey,** who has transferred to the Metropolitan - Vickers Export Co. Mr. Hayward's early work was with Edmundsons Electricity Corporation, Ltd., attached to the Salisbury Electric Light & Supply Co. After war service in the R.A.O.C. and R.E.M.E., he joined Metropolitan-Vickers in April, 1946, and was successively in switchgear engineering, motor engineering, motor sales and transformer sales at Trafford Park. He has been at the Bristol office since 1948.



Mr. G. B. Hayward

Mr. G. L. Greaves has recently been appointed establishments officer for the North Western Division of the British Electricity Authority. Mr. Greaves, who is a chartered secretary, was formerly with the Colwyn Bay, Crewe and Swinton electricity undertakings, and has been the Divisional education and training officer since 1st November, 1949. He served with the R.E.M.E. in France and the Middle East during the war.

Mr. G. L. Greaves

Mr. T. W. Rice, sales superintendent in the Central District, Manchester, has been appointed district commercial engineer to the South West District, No. 1 Sub-Area, North Western Electricity Board. Before vesting day he was distribution engineer with the Newton-le-Willows Urban District Council's undertaking.

Mr. L. M. Jockel, M.I.Mech.E., M.I.E.E., F.Inst.F., F.R.S.A., generating engineer (Hackney), London Division of the British Electricity Authority, is retiring at the end of this month. Mr. Jockel received his educaton at the Heriot-Watt College, Leith Technical College and at Glasgow University, and his technical training with Bertram's, Ltd. Over the period 1909 to 1925 he held various positions in tramway and electricity supply undertakings, and during the 1914-18 war served in the Royal Engineers. From 1925-33 he was power station engineer at Nottingham and resident engineer for the North Wilford extensions. He joined the Hackney electricity undertaking in 1934 as generating engineer at the Millfields power station. Mr. Jockel has been a special lecturer in mechanical engineering at Kingston Technical College since 1946, and was formerly lecturer on fuel efficiency for the Department of Mines, and lecturer and

head of the Department of Electrical Engineering (evening classes) at York Technical Institute. He was at one time a frequent contributor to the *Electrical Review* of articles relating to boiler practice.

Mr. C. L. Fisher has been appointed manager of the British Sales Division of the Consolidated Pneumatic Tool Co., Ltd. Mr. Fisher has been with the company for nearly 33 years.

Mr. David D. Walker, M.A., M.I.E.E., joint managing director of Evershed & Vignoles, Ltd., and a member of the B.E.A.M.A. Council, has been elected president of the British Engineers' Association for 1951-52. **Mr. H. S. Broom,** M.B.E., B.Sc., M.I.Mech.E., joint managing director of Broom & Wade, Ltd., has been re-elected vice-president.

Mr. Christopher Wade (Gabriel, Wade & English, Ltd.) tells us that the number of his house has been changed from 17 to 33, Shakespeare Road, Bedford.

Mr. A. Earls, area manager for Cowal and Bute of the North of Scotland Hydro-Electric Board, with headquarters at Rothesay, has accepted an appointment as chief engineer of the Nigerian Electricity Supply Corporation, Ltd., and takes up his duties there at the beginning of next month. He has lived in Rothesay since 1937 when he was appointed burgh electrical engineer.

At the request of the Belfast Corporation Electricity Committee **Mr. J. M'Candless,** deputy electrical engineer, has withdrawn his resignation.

The Belfast Corporation Transport Committee has recommended that **Mr. J. Mackie,** rolling stock engineer, be appointed general manager and engineer of the transport undertaking in succession to **Col. R. M'Creary,** D.S.O., M.C., who has retired from that post. The salary is £2,300, rising to £2,850.

Miss Wolley has joined Falco Electrical Appliances, Ltd., as senior housecraft adviser and will maintain close liaison between the company and Area Board housecraft advisers. Miss Wolley was previously with Elexcel, Ltd., as chief demonstrator and before that was senior demonstrator, Ludlow District, Midlands Electricity Board.

The third annual horticultural show of the **Benjamin Social & Athletic Club** was held on 1st September in the works canteen of Benjamin Electric, Ltd. Mr. H. G. Campbell (joint managing director), who was accompanied by Mrs. Campbell, opened the show by cutting a ribboned barrier, and later presented the prizes. The judges were Mr. Walkden, editor of *Amateur Gardening*, and Col. Savage, of Staff Caterers, Ltd.

Organized by the Golf and Social Sub-Committee of the **Electrical Industries Benevolent Association,** a dinner and entertainment will be held at the Palace Hotel, Birkdale, Southport, on 24th September, in connection with the National Golf Competition finals. The dinner will be under the chairmanship of Sir Henry Self.

OBITUARY

Sir Holberry Mensforth.—The death occurred on 5th September, in his eighty-first year, of Sir Holberry Mensforth, K.C.B., C. B. E., M. Sc. (Tech.), M. Inst. C. E., M.I.Mech.E. Sir Holberry joined the British Westinghouse Co. (now Metropolitan-Vickers Electrical Co., Ltd.) in 1904 at Trafford Park as a draughtsman, and in 1917 became general manager of the works. During the 1914-18 war he was appointed chairman of the Manchester and District Armaments Committee, and when it was decided to put the Government munitions factories on a peacetime footing he was, in 1920, appointed the first Director-General of Factories at the War Office, a position he held until 1926. In 1925 he became managing director of Bolckow, Vaughan & Co., Ltd., and when the company amalgamated with Dorman, Long & Co., Ltd., in 1931 he was appointed a director of the latter company. Sir Holberry became chairman of the English Electric Co., Ltd., in 1930 and held this position until 1932, when he resigned the chairmanship (although remaining on the board) to become chairman of Edmundsons Electricity Corporation, Ltd., and of the Shropshire, Worcestershire & Staffordshire Electric Power Co. From 1931 to 1945 he was also a director of John Brown & Co., Ltd., and of the main associated or subsidiary companies. At the time of his death he was a director of the Tredegar Iron & Coal Co., Ltd., and of Westland Aircraft, Ltd. He had been a vice-president of the British Electrical & Allied Manufacturers' Association for many years.

The late Sir Holberry Mensforth

Commander F. G. Loring.—The death occurred on 7th September of Cmdr. Frederick George Loring, O.B.E., R.N., at the age of eighty-two. Cmdr. Loring went to sea as a midshipman in 1884. In 1896, when on the staff of H.M.S. *Defiance*, he witnessed some of the first wireless experiments conducted by the Royal Navy and in 1901 he

became a specialist in wireless telegraphy. He was appointed the first Inspector of Wireless Telegraphy with the Post Office in 1908. Cmdr. Loring played a prominent part in the development of ship-shore communications and on retirement from the Post Office in 1930 he became a director of the International Marine Radiocommunication Co. a position from which he retired last year.

Mr. E. M. W. Boughton.—On 8th September Mr. Edward Morley Westwood Boughton, M.C., M.I.P.E., manager of the Birmingham factory of the British Thomson-Houston Co., Ltd., died in Birmingham. Mr. Boughton was born at Exeter in 1887 and was educated at Wyggeston Boys' School, Leicester, and the Leicester Technical School. He joined the B.T.H. Co. in 1912 as a draughtsman, and in 1914 was transferred to the Production Department. Rugby, becoming manager of the Production Department of the company's Birmingham works in 1920. In 1941 he was appointed manager of the factory. He had been president since their inception of the Birmingham Works Foremen's Association and the Birmingham Works Ex-Service Men's Association. Mr. Boughton served in the Royal Engineers during the 1914-18 war and was awarded the Military Cross and Bar.

The late Mr. E. M. W. Boughton

Mr. C. H. G. Hobday.—The death occurred on 1st September of Mr. Clifford Henry George Hobday, managing director of Hobday Bros., Ltd., radio and electrical wholesalers.

Electricity Expansion Vital

EVERY facility should be given for the extension of power supplies, which were a prerequisite of rearmament and should rank on an equal footing. This was the view Alderman W. J. Bennett, chairman of the Eastern Electricity Consultative Council, expressed when the subject of the cuts in capital expenditure was discussed at last Friday's meeting of the Council. Not only power station extensions but the provision of essential power lines must go on. The Council was entirely behind the Central Authority in striving to get sufficient money to put the industry on a sound footing. The Eastern Board was still not able to say precisely what would be the effect of the capital cuts this year.

On the subject of load shedding the chairman said that the General Purposes Committee had that morning considered a statement by Mr. G. N. Green, the Board's chief engineer, and Mr. P. J. Squire, system operation engineer, B.E.A. A resolution had been unanimously passed deprecating the diversion of national resources to the provision of load limiting devices, the view being taken that the money should rather be spent on speeding up the plant programme and expanding the main transmission system, together with the augmentation of the Area Boards' systems.

In response to a request from the Council, the Eastern Electricity Board wrote explaining the reasons why it considered a minimum fixed charge of £3 per annum on all domestic, commercial and farming two-part tariffs to be more appropriate to present day conditions than the previous figure of £2 8s. The Council accepted the explanation, but the Board is being asked to give consideration to the case of one-room flats and similar very small premises.

Private Power Plant

IN a letter to *The Times* of 8th September Sir Lynden Macassey, of the British Internal Combustion Engine Manufacturers' Association, again criticizes the attitude of the British Electricity Authority towards industrialists who have installed or intend to install generating sets for their own use. He refers to a notice published by the Federation of British Industries in which members were told that the B.E.A. was interested in obtaining surplus electricity from private power plant and says it would be an informative subject of inquiry to ascertain what steps have been taken by the B.E.A. or Electricity Boards to assist or encourage this constructive suggestion.

The Minister of Fuel and Power had said that the B.E.A. had agreed to waive all conditions preventing the use of generating plant by factory owners and that agreement had been reached with the F.B.I. on terms which would encourage industrialists to provide and use their own plant. Yet, Sir Lynden Macassey says, he has before him cases in which clauses have been inserted in electricity supply contracts prohibiting the use of private plant "except during such time as the B.E.A. supply shall fail or be restricted by order of the Minister of Fuel and Power." The writer says:—"Where and why and to what extent this is being done would be another illuminating subject of inquiry."

Sir Lynden contends that if the B.E.A. is desirous of assisting national production while maintaining its monopoly of supply it could install generators in factories and charge the factory owners for the installation and running of the plant reasonable charges in excess of those made for the public mains supply. He considers that there are few factory owners who would not be prepared to pay them.

Institution Centres

Chairmen for 1951-52

IN our last issue we published the portraits and brief biographical notes of the chairmen of the specialized Sections of the Institution of Electrical Engineers. We now give below some details of the careers of the chairmen of the provincial Centres of the Institution which we have so far received.

MR. W. H. BRENT, B.Sc., Regional Engineer, Midland Region, G.P.O., Birmingham, is chairman of the South Midland Centre. He received his education at the Southend-on-Sea High School, followed by a degree course in electrical engineering at East London College (now Queen Mary College), under Prof. MacGregor-Morris. After a short period with Siemens Brothers & Co., Ltd., at Woolwich, where he gained experience in the testing of the first continuously loaded Anglo-Dutch cable, Mr. Brent joined the Post Office in 1925 through open competition for assistant engineers, and up to 1934 was in the Engineer-in-Chief's office, first in combating corrosion of cables and later in introducing new methods of construction. He transferred to work in the field and was area engineer at Manchester until 1939, in which year he took up duty as assistant telephone manager in Glasgow.

In 1941 he was appointed regional engineer, Midland Region, where one of his first tasks was to develop the rapid cabling of airfields applying the mole drainer technique. His recent work has included the extensions of telephone exchanges and repeater stations in the Midland Region and responsibility for the equipping and linking up of the coaxial systems for television and telephony which pass through Birmingham.

MR. J. W. ELLIOTT, B.Sc., chairman of the Western Centre, is district office manager for the Edison Swan Electric Co., Ltd., in South Wales. He received his engineering education at London University, graduating in electrical engineering in 1912. His works apprenticeship and subsequent technical experience were obtained with the English Electric Co., Ltd., at Stafford, with an interval of service in the Royal Engineers from September, 1914, to February, 1919. He was appointed to his present position with the Edison Swan Co., in 1921. Mr. Elliott was hon. treasurer of the Western Centre of the Institution from 1939 to 1949.

MR. E. W. ASHBY, B.Sc.(Eng.), chairman of the Mersey and North Wales Centre, attended Bootle Secondary School, and received his technical education at Liverpool Technical College, obtaining his B.Sc. degree in engineering, London. He served an apprenticeship with H. T. Boothroyd, Ltd., Bootle, and in 1914 joined the Royal Engineers and served in France with a Brigade Section of the Signal Service. From 1919 to 1925 he was with Sandycroft, Ltd., near Chester, as contract engineer, the last three years as chief of the Mining and Electrical Departments. In 1925 he joined Callender's Cable & Construction Co., Ltd., as sales representative, and is now sales engineer for British Insulated Callender's Cables, Ltd., in the area based on Liverpool.

Mr. Ashby is a member of the Council of the Liverpool Engineering Society and a Fellow of the Association of Mining Electrical and Mechanical Engineers.

MR. E. C. WALTON, Ph.D., B.Eng., chairman of the North Midland Centre, is Head of the Electrical Engineering and Physics Department at the Leeds College of Technology, a position he has held for eighteen years. He was educated at Liverpool Collegiate School, and

Mr. W. H. Brent

Mr. J. W. Elliott

Mr. E. W. Ashby

Dr. E. C. Walton

Mr. A. W. Hirst

Mr. S. Mc Cracken

Mr. G. R. Polgreen

served a three years' apprenticeship with a Liverpool engineering firm, coupled with evening study at the Central Technical School, Liverpool. He obtained a first class honours degree in engineering at the University of Liverpool, which was followed by two years' research under the direction of Prof. E. W. Marchant. For five years Dr. Walton was research and development engineer with the General Electric Co., Ltd., at the Research Laboratories, Wembley.

MR. A. W. HIRST, M.Sc.(Eng.), is chairman of the East Midland Centre. He received his education at Monkton Combe School and the University of Bristol, where he obtained his B.Sc.(Eng.) degree with first class honours in electrical engineering. From 1917–19 he served with the Royal Engineers (Signals), following which he became a student apprentice with the British Thomson-Houston Co., Ltd., with whom he was later assistant design engineer on large d.c. machines.

Mr. Hirst returned to Bristol in 1926 where he was engaged on research and obtained his M.Sc. degree. From 1927 to 1932 he was lecturer in electrical engineering at the Technical College, Crewe. He then took up the position of chief lecturer in electrical engineering at Leicester College of Technology, where he is now Head of the Electrical Engineering Department. Mr. Hirst is the author of "D.C. Machine Design," "Electricity and Magnetism for Engineering Students," "Applied Electricity" and "Introduction to Electrical Machines."

MR. S. MCCRACKEN, chairman of the Northern Ireland Centre, is manager of the Northern Ireland district of the Metropolitan-Vickers Electrical Co., Ltd. He served an apprenticeship with the Metropolitan-Vickers Co. in 1915 and gained an M-V scholarship to the Manchester College of Technology, where he was awarded the Associateship of the College. On completing his apprenticeship (broken by service with the R.A.F. in the 1914–18 war) he became senior tester on dynamo test. From 1925 he was engaged in the erection of power plant in India, Burma, Singapore, Russian Turkestan, Central Asia and Western Siberia. Mr. McCracken was transferred to the Belfast office of Metropolitan-Vickers in 1934 and carried out a study covering the application of electricity to the textile industry of Northern Ireland. He was appointed to his present position in February, 1950.

MR. G. R. POLGREEN, M.B.E., B.Sc. (Eng.), chief engineer of Salford Electrical Instruments, Ltd., a subsidiary of the General Electric Co., Ltd., is chairman of the North-Western Centre. Mr. Polgreen was educated at Christ's Hospital and at City & Guilds (Finsbury) College, where he received the diploma (A.C.G.F.C.) and degree of B.Sc. in electrical engineering of London University. He has been with the G.E.C. for twenty-six years, the first six of which were spent at the G.E.C. Research Laboratories, where he was engaged in the development of electrical apparatus and components. He was transferred to his present position in 1931. During the last war he was responsible for the design and operation of branch factories for the manufacture of magnetic powder and cores, synthetic sapphires and quartz crystal units.

Mr. Polgreen was chairman of the London Students' Section of the Institution of Electrical Engineers in 1926, and in 1947 was elected chairman of the N.W. Radio Group. He is the author of various technical articles and papers, chiefly on electrical instruments and magnetic materials.

Gauging and Measuring Screw Threads

A NEW series of handbooks under the general title of "Notes on Applied Science" is being prepared by the National Physical Laboratory. No. 1 "Gauging and Measuring Screw Threads" has just been published for the D.S.I.R. by H.M. Stationery Office, price 5s (S1·25 U.S.A.) by post 5s 4d. It is a comprehensive survey of measuring and gauging methods for use in the production and measurement of accurate screw threads and especially of screw gauges. The handbook contains the most up-to-date material available and its scope covers the whole of current requirements. The appendix gives a table of symbols which were agreed at the 1945 Ottawa Conference on the unification of engineering standards, and contains numerical data on the "Unified" thread, as agreed between the U.S.A., Canada and Great Britain as a means of co-ordinating defence measures in these countries.

Public Lighting Equipment

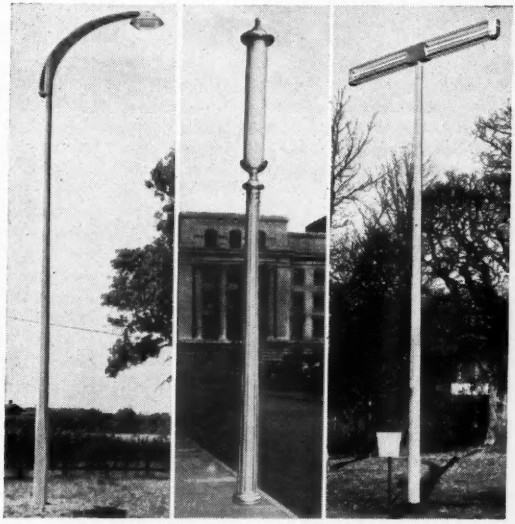
Exhibits at the A.P.L.E. Conference

IN conjunction with the annual conference of the Association of Public Lighting Engineers which is to be held at Brighton next week (18th to 21st September) there will be an outdoor display, along Madeira Drive, of lamp columns and tower wagons. Various makes of lanterns will be fitted to the columns but as the latter will be erected close together the display will be for daylight inspection only and the lanterns will not be lit. The customary indoor exhibition of street lighting equipment and associated apparatus will not take place this year. Nevertheless, the equipment which will be on view in Madeira Drive will be representative of the trend of modern design.

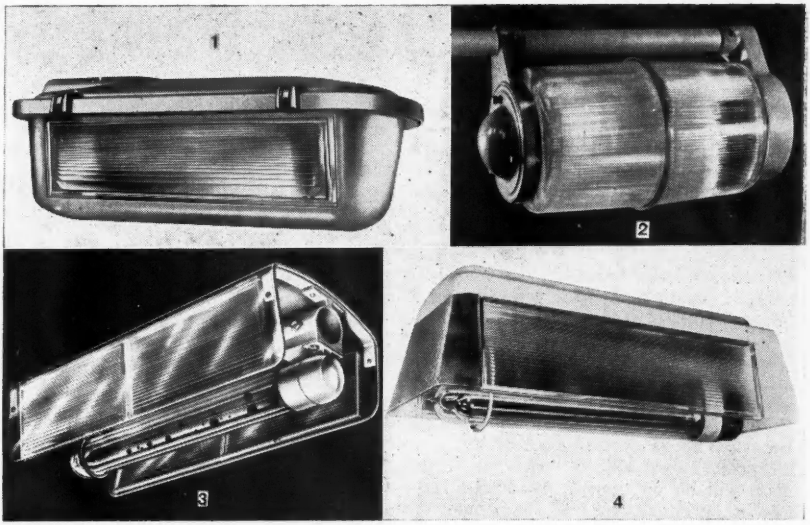
As would be expected, fluorescent fittings will be very much in evidence. On a column shown by Concrete Utilities, Ltd., Thorn Electrical Industries, Ltd., will have their latest type of lantern designed to accommodate three 80 W fluorescent lamps. To demonstrate the advances which have recently taken place in the development of outdoor fluorescent floodlighting, the latter company has arranged to illuminate the façade of the Royal Albion Hotel in changing colour throughout the period of the conference.

Lanterns for fluorescent, sodium and mercury street lighting will be shown by the General Electric Co., Ltd. A development of special interest to those undertaking conversion schemes from gas lighting is the introduction of two sodium lanterns designed to accommodate the gear in the lantern roof, so that they can be used on existing columns not equipped with gear chambers. These lanterns are in two sizes, one for main road lighting with an 85 W or 140 W sodium lamp, and the other for side road use with a lamp of 45 W or 60 W. In general design they correspond with existing main and side road sodium lanterns embodying a system of light control by means of "Perspex" refractor plates cemented to each side of an unplasticized "Perspex" dish. Main and side road sodium lanterns for use with separately installed gear will also be shown together with two sizes of vertical fluorescent lantern.

Among the fittings and columns to be shown by the Revo Electric Co., Ltd., will be a new version of the "Silverblue" lantern, a die-cast fitting with a stainless steel dual reflector using mercury vapour electric discharge lamps. It presents an attractive appearance when mounted on the central reservation of dual carriageway



Left: **Stanton Ironworks spun prestressed concrete column**
Centre: **Revo "Festival" lantern and column**
Right: **"Atlas" lantern for three 80 W fluorescent lamps on a Concrete Utilities column**



(1) Crompton Parkinson " Corona II " enclosed 140 W sodium lantern. (2) Holophane sodium cylindrical lantern. (3) Metrovick " S.O. Fifty-two " side entry lantern for 85 W and 140 W sodium lamps. (4) " Mazda " sodium " open " lantern

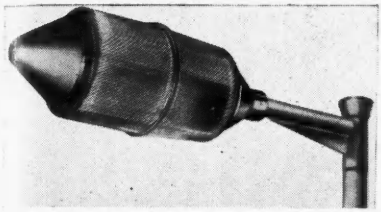
roads, in addition to being suitable for the normal side-of-road position. Another new addition is the " Festival " lantern and cast iron column. The lantern accommodates four 5ft 80 W fluorescent lamps enclosed by a cylindrical " Perspex " cover with an aluminium canopy and base.

A new fitting to be shown by the British Thomson-Houston Co., Ltd., is the " Mazda " sodium " open " lantern for either top or side cable entry. It is almost entirely composed of " Perspex " so that the problems of maintenance associated with lanterns having exposed metallic parts are largely overcome. Two other additions to the company's range are the improved designs of the sodium and mercury " Enclosed " lanterns. The cylindrical sodium lantern of Holophane, Ltd., is an entirely new design for 85 W and 140 W lamps. A feature of this fitting is that the refractor assembly can be rotated about the horizontal axis to adjust the main beams in relation to any road gradient, thus maintaining road brightness and reducing glare.

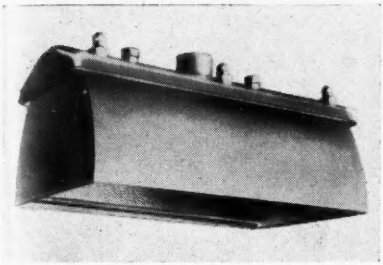
An interesting sodium discharge lantern is also to be shown by Siemens Electric Lamps & Supplies, Ltd. It embodies the Holophane drum refractor which is combined with the vacuum jacket of a standard sodium lamp to form a sealed unit. This unit is held together by two rods which also form the means by which the refractor is fixed to the aluminium end casting. The third member securing the sealed unit is in the form of a tube which also carries wiring to the lampholder. This lantern combines the high efficiency of the prismatic glass reflectors with a pleasing modern appearance and is suitable for use with 85 W and 140 W sodium lamps.

Among the Crompton Parkinson equipment to be on view will be two side-entry " Corona II " enclosed 140 W sodium lanterns on a Concrete Utilities double-arm column and two side-entry " Capella II " open type 140 W sodium lanterns. There will also be a " Taurus " side road lantern for tungsten or mercury lamps on a Stewart & Lloyds steel column with a swan neck bracket.

The Metropolitan-Vickers Electrical Co., Ltd., will introduce its " S.O. Fifty-Two " side entry lantern for 85 W and 140 W sodium lamps. This is an open type companion lantern to the " S.O. Fifty," consisting essentially of a plastic hood carrying the refractor plates and a cantilever casting which supports the entire lantern on the bracket. Among the



Siemens " Sieray " sodium discharge lantern



Brighton Lighting & Engineering Co.'s " P.J. Multilite " cut-off lantern as used in Brighton

sodium lanterns shown by the Engineering & Lighting Equipment Co., Ltd., will be the " Golden Ray " Mark III lantern which is for use with 45/60 W lamps. It has a die-cast aluminium alloy body, and a one-piece " Perspex " bowl with machined prisms of the same material sealed on the inside of the bowl, and is carried in a hinged fabricated aluminium alloy bowl ring fixed by means of quick release toggles. Other makers who will have lighting fittings on view include the Simplex Electric Co., Ltd., the Edison Swan Electric Co., Ltd., Falk, Stadelmann & Co., Ltd., and the Wardle Engineering Co., Ltd. Apart from those already mentioned columns will be shown by the Stanton Ironworks Co., Ltd., Poles, Ltd., and Costain Concrete, Ltd.

The conference programme includes an official tour of the lighting installation in Brighton and it is interesting to note that the Brighton Lighting & Electrical Engineering Co., Ltd., has been mainly concerned with the lanterns and flood projectors. During the last few years a special type of cut-off lantern has been installed which was developed by the company in collaboration with Mr. H. Pryce-Jones, manager Mid-Sussex Sub-Area, South Eastern Electricity Board, who is the new president of the A.P.L.E. It is called the " P.J. Multilite " lantern and it is fitted with three gas-filled lamps in line.

B.E.A. Plant Contracts

Aggregate for Month £4·2 Million

DURING the past month the British Electricity Authority has placed contracts for equipment for power stations, transforming stations and transmission lines amounting in the aggregate to £4,203,375. The principal contracts include the following:—

Acton Lane " B " power station: generator. station and unit transformers.—Ferranti, Ltd, Littlebrook " C " station: 11 kV, 6 kV and low voltage power and control cables and accessories.—W. T. Henley's Telegraph Works Co., Ltd. East Yelland station, near Barnstaple: foundations for second half of main building.—Taylor Woodrow Construction, Ltd. Bold station, St. Helens, Lancs.: coal handling plant.—Naylor Bros., Ltd. Doncaster station: civil engineering works.—Higgs & Hill, Ltd. Skelton Grange station, Leeds: extension of boiler house foundations and ancillary works.—Harold, Arnold & Son, Ltd. Stella North station, Blaydon-on-Tyne: site clearance and preliminary works.—Sir Robert McAlpine (Newcastle-upon-Tyne), Ltd. Chadderton station, Oldham: brick chimney.—P. C. Richardson Co. (Middlesbrough), Ltd. Carrington station, Manchester: three 360,000 lb/hr boilers.—John Brown & Co., Ltd. Fleetwood station: generator and unit transformers.—English Electric Co., Ltd. Roosecote station, Barrow: boiler house buildings.—Dorman, Long & Co., Ltd. Ince station, Capenhurst: 132 kV 2,500 MVA switchgear.—English Electric Co., Ltd. Llanelly substation, Carmarthen: 33 kV and 11 kV static condensers.—British Insulated Callender's Cables, Ltd. Bonnybridge substation, Stirling: 132 kV switchgear.—British Thomson-Houston Co., Ltd.

Longstone–Gorgie–Telford Road (South-East Scotland): 132 kV and 33 kV cables.—Pirelli-General Cable Works, Ltd. Kilmarnock–Kendon: 132 kV overhead line equipment.—Watsham's, Ltd.

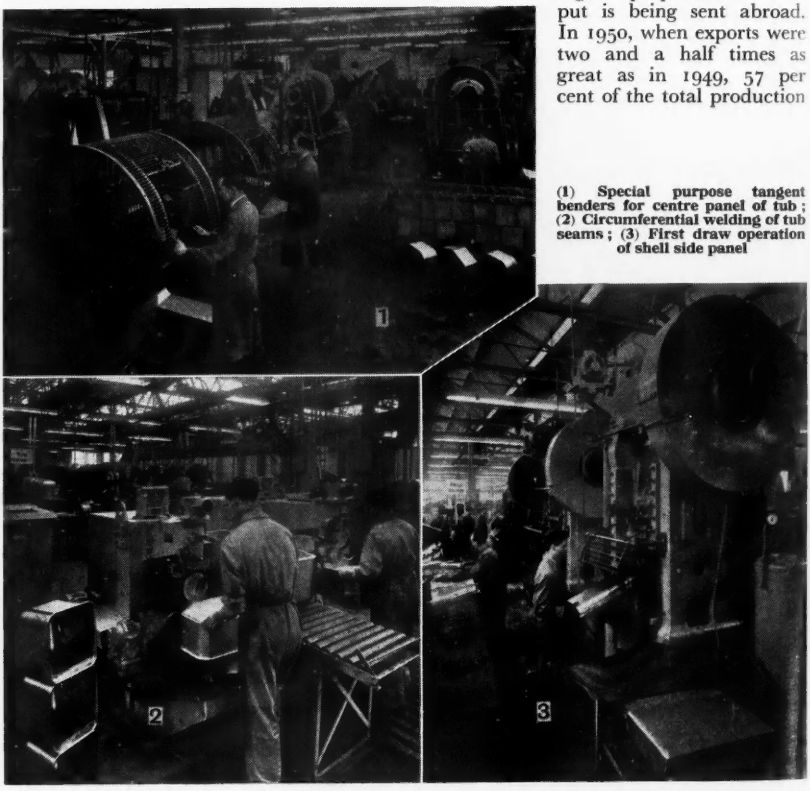
Washing Machine Manufacture

Extensions at the Hoover Factory at Merthyr Tydfil

WITH a floor area of 140,000 sq ft the Hoover factory at Merthyr Tydfil is now claimed to be the largest in Great Britain devoted exclusively to the manufacture of electric washing machines. The original factory, on the 27½ acre site, opened in October, 1948, had 90,000 sq ft of floor area and produced up to 10,000 machines a week. A 50,000 sq ft extension just put into service will further increase output. A second similar extension is now in hand and the company also has plans for extending the boiler house and canteen, and erecting a 20,000 sq ft material handling bay.

In addition to the main factory the company also operates two sub-factories not far away. The wringers are made at Aberdare, and packing and despatch are undertaken at Cyfarthfa. Production of the motors, originally carried out at Merthyr Tydfil, was transferred a year or so ago to the company's motor factory at Cambuslang.

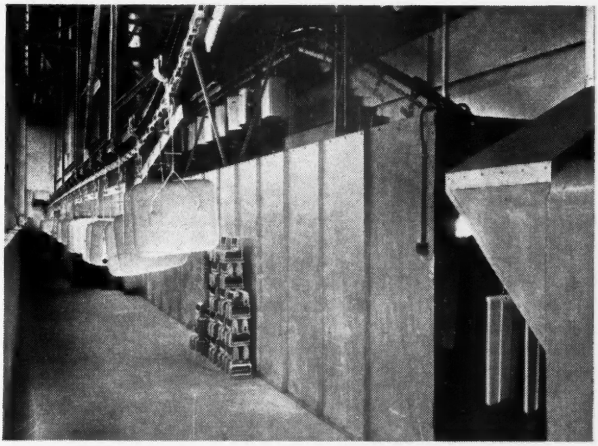
Despite the greatly increasing demand for machines in this country a progressively higher proportion of output is being sent abroad. In 1950, when exports were two and a half times as great as in 1949, 57 per cent of the total production

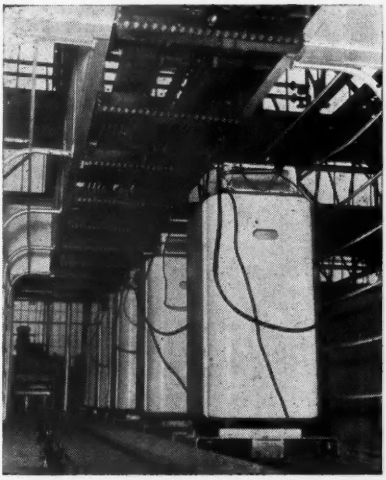


(1) Special purpose tangent benders for centre panel of tub; (2) Circumferential welding of tub seams; (3) First draw operation of shell side panel

went overseas. At present over 90 per cent of the output is destined for Commonwealth or foreign countries, the high earning capacity in relation to the weight of raw materials used being very beneficial to this country's economy in the matter of securing vital overseas currencies.

Situated in one of the Government's development areas, the factory makes an important contribution to the solution of the problem of securing full employment. At present it provides work for about 1,250, of which 86 per cent are male and over 10 per cent are disabled. The numbers required will increase, of course, as the new extensions come into operation and production expands.





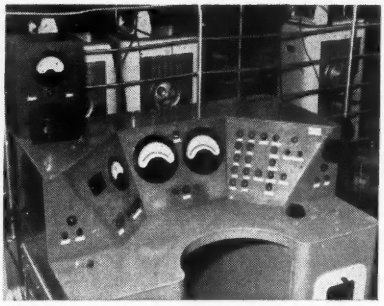
Above: **Part of the enamelling shop.** *Below:* **Continuous automatic testing plant**

Apart from permitting a general improvement in the factory layout, making for greater efficiency and convenience of operation, the extensions now in hand also provide facilities for undertaking a number of new processes which will go some way in assisting the company to overcome difficulties arising out of the shortage of certain raw materials.

In the layout of the factory an endeavour has been made to arrange that the first operations of processes are carried out near the material handling bay in order that the process waste (which is always greatest in the early stages) can be easily collected and removed from the factory.

Throughout manufacture mechanized handling has been adopted whenever practicable, conveyors being used to take the various components between operations and eventually bringing them to the assembly, test and inspection points before packing and despatch.

For the manufacture of the tub, the sheet metal is received in sizes large enough to produce both a right- and a left-hand tub side. After notching, drawing and coining, the two parts are separated on a trimming die and then have their top lips formed on. At the same time the centre panel of the tub is formed on presses and folded into shape on special-purpose tangent bending machines. These three components of the tub are first tack welded and then seam welded together by resistance welding machines. When the drainage pipe has been soldered on the completed tub is taken by overhead conveyor to the assembly line.



Test gear panel

Meanwhile the components of the cabinet, the front, side and back panels, the belt guard and foot assembly are produced on a flow line of presses and spot welded to form sub-assemblies, which are then passed through a continuous cleaning, bonderizing and enamelling plant, whence they pass on to the assembly line to join the tub, wringer, motor, etc.

To reduce shipping space many machines are supplied in sub-assembly form for assembly on arrival at their destination. In these cases the components are arranged for screwing together instead of being welded.

Testing is carried out as a continuous operation on an automatic plant. The completed machines are loaded on to a conveyor, filled with water and automatically tested under load for all mechanical and electrical faults. The water is then emptied out, the belt guards are assembled and the operating instructions added. Protected by hessian jackets, the machines are ready for loading into one of the company's fleet of forty or so transport vehicles, each of which can carry between 120 and 204 machines.

T.U.C. and Power Situation

Appeals for Co-operation

ON Thursday last week the Trades Union Congress, meeting at Blackpool, passed a resolution on the power situation moved by Mr. J. F. Wallace, general secretary of the Electrical Power Engineers' Association. The resolution, which was carried unanimously, pointed out that continued load shedding was inevitable unless further capital was made available to the electricity supply industry. It called on the General Council of the T.U.C. to make representations to the Government on the subject. In moving the resolution Mr. Wallace said that over 40 per cent of the heavy generating plant produced in this country was being exported.

Mr. F. Foulkes, general president of the Electrical Trades Union, supported the motion and said that by 1960 the power situation would be even worse than it was at present if the Government did not allow the British Electricity Authority to spend capital on the plant which was needed.

Mr. T. Williamson, who opened the discussion on the serious state of electricity supply, said that the workers must adjust their way of life to the measures necessary to meet the situation. The shortage had risen because insufficient plant had been installed to meet the rising industrial demand and the improvement in living standards. If demand were spread evenly over the twenty-four hours there would be no problem; the General Council was satisfied that the B.E.A. was doing all it could to meet the situation.

New plant was being put into commission but that had been planned about five years ago. The present limitation of capital expenditure did not have immediate effect; it would be felt in 1956 and onwards. Mr. Williamson also referred to the obsolescent plant which had to be kept in service and was constantly liable to breakdown.

After an appeal to domestic consumers to avoid using electricity at peak times, the speaker said that both employers and workers' representatives saw no adequate way of avoiding load shedding which did not involve some adjustment of hours of work—including double shifts and nightwork. He appealed to the membership to co-operate with the Electricity Boards in putting some of these adjustments into operation and he also exhorted managements to do their best to ensure that fuel was efficiently used in their works.

Another speaker in the discussion, Mr. W. Monk, of the National Union of Enginemen and Firemen, suggested that the B.E.A. should consider the introduction of incentive bonuses which would speed-up the overhaul of plant. He also considered that the unions concerned should agree to "dilution" to provide more workers; the country could not afford restrictive practices at the present time.

Resale Price Maintenance

Statement by British Refrigeration Association

LAST week in our report of speeches at a British Refrigeration Association luncheon we reproduced briefly some remarks made by Mr. E. G. Batt, the director and secretary of the Association, on the subject of resale price maintenance. The matter is being taken up by the Association with the Board of Trade and we have received a copy of a statement presented to the Board.

In the first place the Association refers to the Government's proposal to introduce legislation to make illegal collective arrangements designed to ensure that goods shall be sold at or above specified retail prices; and any indication by a manufacturer or other supplier of goods of a resale price for those goods unless it is clearly stated to be a maximum price.

Policy of Association

The Association says that since its inception it has always declared its intention as a matter of fundamental policy to "promote and protect the interests of manufacturers and others dealing in refrigerators or commercial or industrial refrigerating plant and equipment therefor *with due regard to the interests of the public.*"

At no time have the members operated a collective price maintenance scheme, nor have they any intention of doing so. Each individual manufacturer fixes his own user prices in free competition with his fellow manufacturers. Every member is required to sell his goods under a strict guarantee, by the terms of which the user is properly protected and assured of such maintenance service as may be necessary during a prescribed period, which in the case of some equipments extends over a period of five years.

It is emphasized that resale price maintenance has nothing whatever to do with "price rings." Each manufacturer, as in the case of the refrigeration industry, remains in competition with others and lowers or raises his individual retail selling prices in the light of his own changing production costs, etc.

The report of the Lloyd Jacob Committee on Resale Price Maintenance, before whom evidence was given on behalf of the Association, states (paragraph 40) that "it is important to the manufacturer, once he has decided the range of price and quality for which he intends to cater, that possible customers should not be lost to him through the retail price being raised by the distributor beyond the limit of this range." It is further stated in paragraph 85 of the report:—"We conclude, therefore, that the effects of severe price-cutting of well-known branded goods may well be harmful to the wider interests of the public."

Finally, in its Conclusions and Recommendations, the Committee records (paragraph 162):—"We take the view that the manufacturer of a branded article remains responsible for the quality of the goods sold under his own brand; he cannot, therefore, be indifferent to the terms on which his goods are sold to the public . . . Resale price maintenance offers a convenient means of protecting brands against misuse by distributors in this or other ways." The Committee recommended (paragraph 163) that no action should be taken which would deprive an individual producer of the power to prescribe and enforce resale prices for goods bearing his brand.

It appears, the B.R.A. says, that the Government, which set up the Committee, now proposes completely to ignore its recommendations.

Service Arrangements

The question of eliminating price competition "between shops with different levels of cost" does not arise in the refrigeration industry, whose products are essentially "technical" or "capital" goods and not "over-the-counter" consumer goods.

Further, the distributive side of the industry is very heavily concerned in the question of service, the maintenance of stocks of spares and equipment and the employment of properly skilled staff. The

manufacturers rightly consider these obligations as essential to the granting of a distributorship, both in the interests of their products and their users. The continued training and security of employment of technically skilled workers by both the manufacturer and his distributor in no small measure rests upon the continuance of the industry's well-proved policy. The interlocking of contractual obligations whereby any particular make of refrigerator obtained from an authorized distributor can be subsequently serviced and repaired by any other authorized distributor of that product, creates a background of mutual obligations that are in effect, and must remain, largely collective in their enforcement and administration, although individual in origin.

The main object of resale price maintenance is to ensure fair prices for all concerned, that is the manufacturer, the distributor and the user. It is to prevent the exploitation of the consumer by unnecessarily high prices in times of shortage and exploitation of everyone by " cut-price sharks " in times of plenty. It is the elimination of price cutting that has produced stability of confidence and fair dealing in the industry.

If resale price maintenance insofar as the refrigeration industry is concerned, is either forbidden or hampered, the only possible consequence will be that many honest distributors will be forced out of business and that the long-term interests of the public will inevitably suffer, as they will no longer be able to obtain the after-sales-service which is so essential.

Transformers for Canada

REFERENCE was made in our 24th August issue to the 400,000 kVA of 300 and 275 kV transformers which Ferranti, Ltd., are supplying to the Aluminum Co. of Canada. The contract covers generator transformers for the Kemano hydro-electric station and the corresponding step-down system transformers for the aluminium reduction plant at Kitimat. It was secured against international competition.

The 71 MVA single-phase Kemano generator transformers form a 213,000 kVA 13·2/301 kV three-phase bank connected through double primary windings to two generators. Forty-nine miles away the 37 MVA single-phase step-down transformers for Kitimat will form a 111 MVA 275/73·2 kV three-phase bank. Transformers for both sites are of the " OFW " (forced oil, forced water cooled) type and are of the Ferranti directed oil flow construction.

The Kemano generating station is to be built underground. The generator transformers are to be installed in underground cubicles hewn out of the solid rock, adjacent to the generators, some 300ft below the surface. This position, reached by means of a long underground access tunnel, has created special problems. The weight and both the transport and the service dimensions have been restricted and it has been necessary to decide upon a suitable terminal layout for the 301 kV output to carry power from the cubicles to the surface transmission line.

Another factor which it has been necessary to take into consideration is that under emergency conditions it must be possible to withdraw any transformer from its cubicle and replace it by a spare in under three hours. Considerable ingenuity has been necessary to achieve this quick change-over feature on these transformers, each single-phase unit of which weighs approximately 100 tons. The oil, water, and control circuit connection, must all line up accurately and be of special design to suit this need.

The Kitimat transformers are for installation in the open and will be subject to the most rigorous weather conditions.

It is claimed that the ultimate capacity of the Kemano hydro-electric station will be about 1,600,000 h.p. and that the output will exceed that of any other single generating plant ever built.

The project is now taking shape, not within easy reach of ample supplies of material and manpower, but in the wilderness of North Western Canada 400 miles north of Vancouver towards the southern tip of Alaska, a steep and jagged mountainous terrain, thickly wooded below the snow line, and over which there are no roads or railways. Many new access roads to the site works have had to be built. One of these from railhead at Burno Lake to the east end of Tahtsa Lake is in itself 100 miles long. The scheme is expected to be in operation in 1954.

Educational

The 1951-52 session of the Electrical Engineering Department of the Polytechnic, Regent Street, London, W.1, commences on 24th September. Copies of the prospectus of evening courses can be obtained on application to Mr. W. H. Date, head of the Department.

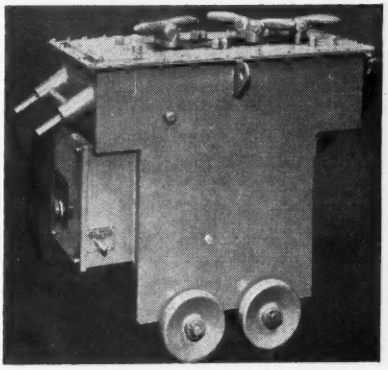
Twin-Arc Welding

Equipment Developed by the G.E.C.

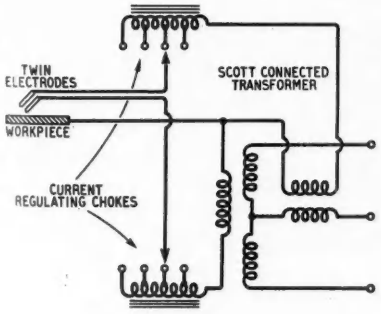
THE latest welding set to be introduced by the General Electric Co., Ltd., is the outcome of an endeavour to produce a.c. welding equipment which would impose a balanced three-phase load on the input mains at a high power factor, without the expense of a p.f. correcting capacitor.

By using two parallel electrodes insulated from each other by their normal flux coating and fed from a three-phase to two-phase transformer, the whole of the arc energy is concentrated into successively burning arcs from each electrode tip to the workpiece. Only a very small (single-phase) component of the current bridges the gap between the electrode tips.

Since ionization due to the burning arc from one electrode assists in re-striking an arc from the other electrode and because temperature fluctuation in the arc zone is reduced, the open circuit secondary voltage (normally about 80 V) is much lower, with a corresponding improvement of power factor. With most electrodes a secondary voltage as low as 45 V is possible when welding mild steel, or 60 V instead of 100 V for stainless steel, while the average p.f. is about 0·55 instead of about 0·3.



G.E.C. twin-arc welding set



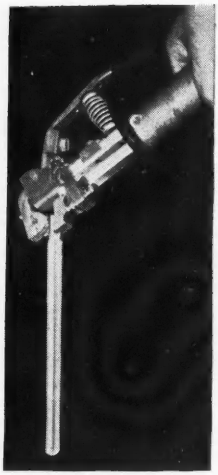
Basic circuit of 3/2-phase twin metallic arc welder

As a direct result of the improvement in arc stability the arc is quieter and much more easily controlled so that it is difficult even for a complete novice to deposit a bad weld. Because of the improved thermal efficiency of the two-phase arc and the fact that a larger total cross-section of electrode can be used for a given size of weld, the rate of deposition as compared with single-phase welding is from 20 to 50 per cent faster, depending upon the size and type of weld being produced.

A further improvement in welding speed arises from the fact that twin electrodes of standard lengths deposit about 70 per cent greater length of weld metal than equivalent single rods, with a consequent saving in time for rod changing. Experience has shown that on a $\frac{5}{16}$ in fillet weld the total saving compared with single-arc welding is about 45 min for each 100ft of welding, 30 min being due to greater welding speed and 15 min to less frequent rod changing.

Although the equipment is intended primarily for service as a twin-arc set it can be used as a normal double operator unit with independent control for each welder. For this purpose a change-over switch is provided which gives 45 V or 60 V on the secondary terminals, the higher voltage being for single-arc welding. This feature is useful when special types of electrodes are necessary, or when the equipment is used for tacking and intermittent

Twin-electrode holder



welding operations in very confined spaces.

The set consists of a Scott-connected three-phase to two-phase step-down transformer and chokes, the transformer primary being provided with tappings for operation off 360/400 V mains.

The maximum primary current is 34 A with 45 secondary volts or 45 A with 60 secondary volts. The secondary windings are connected in series with chokes which have fixed cores, and welding current variation (50/250 A) is obtained in 36 steps by tappings connected to radial switches permitting coarse and fine current regulation.

The electrode sizes which can be used with the set range from 14 s.w.g. to 6 s.w.g. (single or twin). They are made by parallel extrusion and although a single flux coats the two core wires, the latter are separated from each other by a layer of flux.

To accommodate the electrodes a new type of holder has been developed which is a light but robust tool. It is designed for continuous use at 250 A per electrode, which is equivalent to 500 A on single-arc welding. It is of simple construction, the electrodes being gripped between easily renewable spring-loaded copper jaws which are grooved to accommodate different sizes of electrodes.

All mild steel and stainless steel electrodes in common use are suitable for service with the set. If twin electrodes are not available satisfactory results can be obtained by using standard single rods tied together in pairs with string or iron wire. Nickel alloy rods which normally have a graphite covering cannot be used because the coating itself is a conductor.

To extinguish the arc when the twin electrode is withdrawn from the workpiece, a relay-operated contactor automatically opens one of the three primary leads thus causing a redistribution of the primary currents which, in turn, results in a voltage reduction across the electrode tips sufficient to extinguish the arc. The maximum voltage between the electrodes and the workpiece is reduced to 35 V so that risk of shock to the operator is virtually eliminated.

The particular advantage of this set from the electrical point of view is that its inherent p.f. without correction approaches that obtainable on full load from single-phase plant incorporating a capacitor for power-factor improvement. Unlike the latter, however, the p.f. remains practically constant over the whole range of welding current.

Arrangements are in hand between the General Electric Co., Ltd., and the Quasi-Arc Co., Ltd., whereby the latter company will become sole concessionaires for the equipment.

Italy's Electrical Trade

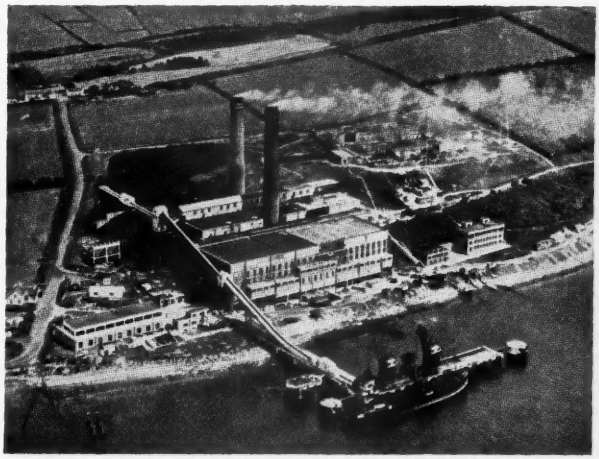
DURING the second half of last year the value of Italy's electrical exports was nearly 2½ times that of her imports. The total of "electrical machinery and apparatus and material destined for electrical uses" exported was 7,799 million lire and that of imports of such goods 3,221 million. Comparison with 1949 totals, however, shows that then the difference was much greater; exports of power plant were about five times the value of imports and of unspecified electrical apparatus about three times. The trend is of particular interest in view of the programme of reconstruction and expansion of power supply which has been carried out and the further plans that are proposed.

Changes in classification prevent detailed comparison, but a big increase is apparent in Italy's exports of transformers in 1950. Germany and the United States were prominent suppliers of power plant to Italy last year, with the United Kingdom taking a fair share. Good customer countries were Argentina, France, Poland, the U.S.S.R. and Uruguay.

The official exchange value of the lire has been 1,748 to the £ since September, 1949.

Northern Ireland Supply

Financial Problem of Rural Electrification



Ballylumford power station, the capacity of which has been raised to 124,500 kW by the installation of a fourth set

SCHEMES for providing electricity supplies to 3,712 farms, 5,824 rural and 510 miscellaneous consumers such as churches, halls, schools and small industries were approved last year by the Northern Ireland Electricity Board. This rural electrification programme represents an estimated capital expenditure of £1,700,000 and is being pursued in accordance with the Ulster Government's request that rural development should be carried out to the fullest extent possible.

It presents, however, a financial problem, for the annual revenue return is estimated at only 7½ per cent which, as the Board's secretary, Mr. Lendrick McMaster, points out, is totally inadequate. The Board feels that scarce materials should be used only to give supplies to those farmers and rural consumers who are prepared to make the fullest use of electricity. In a recent statement on this point the chairman, Sir William Robinson, said that farmers and others must give evidence of their desire to use electricity for more than lighting and radio by providing the necessary appliances and equipment before connection. So far, revenue from farms has been disappointing.

Wayleaves are a source of hindrance and added expense. The Board's report draws attention to the fact that where the negotiations are unduly prolonged and demands are made by landowners for equipment to be placed in particular positions the extra cost must be reflected in charges to consumers.

Despite these difficulties and shortages of essential materials, 8,299 additional consumers were connected during 1950—3,800 in urban and 4,499 in rural districts. The Board's area covers Ulster with the exception of Belfast and Londonderry. At the end of the year consumers numbered 100,885 (66,533 in boroughs and urban districts and 34,352 in rural districts). Sales rose by 15·7 per cent to 251·7 million kWh. Ten years ago (in 1940) they totalled 49·7 million kWh.

Commenting on the trend of development, the report says that an increasing use of low level, high temperature radiant fires in schools has confirmed that this type of space heating is efficient and economical; the availability of adequate supplies of electricity at a relatively low cost has continued to be a factor in promoting industrial expansion; and improved methods of street lighting (including several large fluorescent installations) have been adopted by many authorities.

Ballylumford power station was in service

throughout the year and generated 354·2 million kWh, the maximum load being 88,826 kW. The installation of No. 4 turbo-alternator has brought the station up to its full capacity of 124,500 kW.

Work on the reconstruction of the l.v. systems of acquired undertakings and the change-over of consumers' installations from d.c. to a.c. was completed at Portstewart, Ballycastle, Portglenone, Clogher, Armoy, Claudy, Dungiven and Gortin. Altogether 244 miles of h.v. lines and 142 miles of l.v. mains and distributors were constructed during the year (making the totals 2,066 miles and 1,253 miles, respectively).

Gross revenue rose by £218,996 to £1,668,583, while expenditure (£1,349,762) went up by £205,671, the rate of increase of income thus being 15 per cent compared with 18 per cent for expenditure. Higher coal costs have more than offset the savings made by the installation of more efficient plant. After allowing for interest charges, etc., there was a net surplus of £884, compared with £660 in 1949. The average price obtained per kWh sold was 1·53d. (against 1·54d.), there being no tariff increases during the year.

Capital expenditure last year aggregated £2,013,595, which included £502,640 on the further extension of Ballylumford power station and associated h.v. transmission system, £974,001 on other h.v. transmission and £439,687 on l.v. distribution. Capital expenditure in rural areas amounted to £632,951, the Board having made somewhat better progress than expected.

Merseyside Power Failure

FOLLOWING the extensive electricity failure in its area the Merseyside and North Wales Electricity Board issued a statement explaining that the Lancashire coastal section together with parts of Cheshire and North Wales was connected to the remainder of the grid by three main lines. At about 5 p.m. on 3rd September these three lines were heavily loaded and the most northerly was automatically disconnected as the result of a fault. This caused additional loads to be thrown on to the remaining two lines which overloaded them and they were also disconnected. As a consequence the greater part of the Board's area was disconnected from the rest of the country and the amount of generating plant was insufficient to meet the load. Portions of the system were disconnected in an attempt to arrest the fall of system frequency, but this was ineffective. At about 5.20 p.m. generation came practically to a standstill and Clarence Dock and Lister Drive generating stations in Liverpool had to be disconnected from the rest of the system, as a result of which supplies elsewhere were completely interrupted apart from the hydro-electric stations in North-West Wales.

At about 5.35 p.m. supplies were again made available in the Chester district from outside the affected area and shortly afterwards at Birkenhead and Southport. In the St. Helens district some supplies again became available from the generating station at about 5.30 p.m., but further trouble occurred five minutes later and supplies were not restored fully until 6 p.m. At Wallasey an attempt was made to provide a supply from the generating station but this was unsuccessful and supplies were restored between 6.15 and 6.30 p.m. from the Birkenhead system. In Liverpool, Lister Drive and Clarence Dock generating stations had been separated at 5.20 p.m., when all supplies from Lister Drive were discontinued. It was, however, possible to restore limited supplies from this station at 5.45 p.m. Clarence Dock continued to run on a very limited scale until 6 p.m., when generation ceased. Thereafter supplies from the grid to the Liverpool system were restored partially at 6.45 p.m. and progressively increased as generating plant became available. The majority of supplies were resumed by 8 p.m., although in a few local instances this was not completed until about 8.30 p.m.

In a letter replying to a demand by Mr. J. R. Bevins, M.P., for a Ministry inquiry into the failure, Mr. Harold Neal (Parliamentary Secretary, Ministry of Fuel and Power) said he was satisfied that the B.E.A. was making every effort to complete an effective and detailed investigation and he did not think that action by the Ministry would be required. Such incidents were extremely complicated and it was not surprising that he could not yet give the immediate cause of the breakdown.

E.A.W. Examinations

THE twenty-ninth E.A.W. Certificate examination in electrical housecraft for demonstrators and saleswomen was held on 14th June, when fifty candidates qualified for the certificate, four gaining distinction. The total number of certificate holders is now 1,699.

The twenty-sixth certificate examination of the Association for teachers was held on 16th June, when thirty-seven candidates qualified for the certificate, making the total number of holders 1,646.

Commerce and Industry

Power Station Overtime Ban

N.C.B. Electricians' Spare-Time Work

LITTLE change has been reported in the attitude of the manual workers in about 40 power stations toward the resumption of overtime working. In an endeavour to persuade the men to raise the ban which has now been in operation for some weeks the British Electricity Authority raised wages by 2d an hour with retrospective effect to 1st June.

At the Trades Union Congress last week Mr. F. Foulkes, general president of the Electrical Trades Union and chairman of the employees' side of the National Joint Industrial Council for the Electricity Supply Industry, appealed to the men to revert to normal working. He said that the maintenance of electricity supply was of vital importance to the workers themselves and moreover a return to normal working would prevent future negotiations on wages and conditions being prejudiced.

Board-Contractor Co-operation

The Liaison Committee established some time ago by the South Wales Electricity Board and members of the Electrical Contractors' Association in the area, has decided to hold a second one-day conference at Cardiff on 25th October. Papers will be read by representatives of both sides and the proceedings will conclude with an informal dinner.

Irish Labour in England

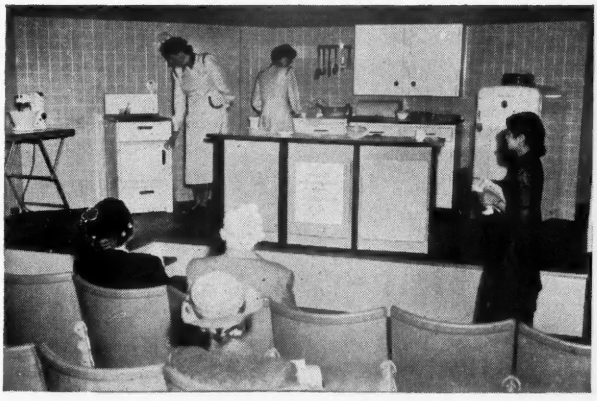
Recent criticism in Ireland of the conditions under which Irish workers are housed and treated in this country has led Mr. H. D. McGough, Dublin manager of the General Electric Co., Ltd., to rebut the charges in so far as his company is concerned. In a letter to the Dublin newspapers Mr. McGough says that carefully "vetted" lodgings are found for all the Irish workers engaged by the company. At the works they enjoy good conditions and everything possible is done to safeguard not only their social, but even their spiritual welfare. He goes on to say that, "apart from humanitarian considerations, it is only good sense and good business to ensure their comfort and happiness. Firms who are proud of their products are equally proud of the welfare departments of their works."

Mexican Electrical Imports

A list is given in *Intercambio*, the organ of the British Chamber of Commerce in Mexico, for the guidance of British exporters, of goods the import of which is restricted and for which special import licences must be obtained from the Ministry of National Economy. These permits are generally granted when the need of such equipment by any industry is shown and when there is difficulty in obtaining them from local sources of production. The electrical goods in the list include the following:—Electrolytic copper, various types of copper wire and cable, generators, electric motors, transformers, radio and television receivers, switches, contacts, switchboards, etc.

"Time for Tea"

A twice-daily series of cookery demonstrations to the theme of "tea and the things that go with it" are being given in the grand gallery of the Tea Centre, Lower Regent Street,



Miss May Barnard giving a cookery demonstration at the Tea Centre, Regent Street, London

London, over a period of six weeks by the London Electricity Board and the British Gas Council. From 27th to 31st August, demonstrations on "Four o'clock Favourites" were given by Miss May Barnard, of the London Electricity Board, and different recipes were presented at each session. The aim of these demonstrations is to give the housewife different ideas for achieving variety, as well as attractive presentation, in her cakes and pastries. Miss Barnard is also giving electrical cookery demonstrations this week and during the final week of the series, 24th to 28th September.

Nationalized Industries Excluded

Because of its policy not to admit nationalized industries to membership, Peterborough Chamber of Trade has refused to accept the Eastern Electricity Board as a member. The Chamber refused to sponsor a recent Ideal Home Exhibition held at Peterborough because some of the exhibitors were nationalized industries.

Lamp and Battery Publicity

A number of attractive sales aids have been prepared by Siemens Electric Lamps & Supplies, Ltd., for its electric lamps and batteries. For its 30in by 20in lamp display piece, the company is again using the black cat design and this will appear on London buses. A similar design on 17in by 19in circular "targets" will appear on buses throughout the Provinces. For shop displays, the 30in by 20in piece will be mounted, the eyes of the cat being translucent with provision for a lamp to be placed behind them. A new showcard (20in by 15in) depicts the sun setting behind a London skyline, and bears the slogan "Now is the time to use Siemens lamps." Advertisements will appear in a number of Provincial newspapers.

New lamp showcard prepared by Siemens Electric Lamps & Supplies, Ltd.

New material for publicizing the company's batteries includes a display (20in by 30in), depicting a steeplechase, with the leading horse clearing a jump and carrying the slogan "Siemens batteries stay the course." There are also new showcards.

S.W. Board's Service Centre

The accompanying picture shows the interior of the new Service Centre of the South Western Electricity Board at Whiteladies Road, Bristol. The laylights, which provide the necessary daylight, are fitted with louvres behind which fluorescent lighting is installed. The demonstration room can be seen in the background.

New Service Centre opened in Bristol by the South Western Electricity Board

Rapid Work for Jamaica

British Insulated Callender's Cables, Ltd., has supplied 550 miles of bronze and cadmium-copper telegraph wire to Jamaica for restoration of the Island's hurricane wrecked telecommunication systems. Part of this order, 100 miles of bronze wire, was required with the utmost urgency and was therefore produced and despatched by air in six days. The work had to be started more or less from scratch and included casting, hot rolling, wire drawing and inspection.

Photographic Society's Exhibition

The Royal Photographic Society's 96th annual exhibition was to be opened by Lord Brabazon yesterday (Thursday) in the Society's House, 16, Princes Gate, S.W.7, close to the Albert Hall. It will be open to the public without charge from to-day until 14th October, from 10 a.m. to 8 p.m. daily (Saturdays 10 a.m. to 5.30 p.m., Sundays 2.30 to 5.30 p.m.)

B.B.C. Television Order

Part of the television equipment for the new Lime Grove studios has just been ordered by the British Broadcasting Corporation from Marconi's Wireless Telegraph Co., Ltd. Nearly £50,000 worth of apparatus is to be supplied, including six complete Marconi Image Orthicon camera chains, nine 10in picture monitors, one supervisory desk, one 16in picture monitor, one complete set of inter-communication equipment, vision mixing, relaying, and amplifying installations, waveform generators and test equipment, together with six monoscope cameras and camera channels.

Electricians' Spare-Time Work

Mr. L. C. Penwill, Director of the Electrical Contractors' Association, has complained to the National Coal Board that cases have been reported to him of electricians employed by the Board undertaking substantial installation contracts in their spare time. He quotes instances of local councils giving contracts to these electricians for the wiring of as many as 60 houses at a time. Mr. Penwill deduces from this that some of the men concerned cannot be fully occupied with the Board's work and he suggests that the Board should consider releasing them for more urgent electrical work for which skilled labour is required.

A spokesman for the N.C.B. said on Monday that there was nothing to stop electricians working in their spare time. There was no undertaking that they should do Coal Board work only. If they liked to practice their trade outside normal working hours they were entitled to do so.

Prices of Materials

In the accompanying table we give the prices of the more important materials used in the electrical industry. The figures are those quoted on Monday last.

ALUMINIUM Ingots	ton £124 0s 0d
COPPER, H.C. Electro	ton £234 0s 0d
Fire Refined 99·7 per cent ..	ton £233 0s 0d
Fire Refined 99·2 per cent ..	ton £232 10s 0d
COPPER Tubes	lb 2s 2¾d
Sheet	ton £284 10s 0d
H.C. wire and strip	ton £261 15s 0d
LEAD, English	ton £181 10s 0d
Foreign	ton £180 0s 0d
MERCURY	flask £73 10s 0d
TIN	ton £960 0s 0d
ZINC, G.O.B. Foreign	ton £190 0s 0d
Electrolytic	ton £194 0s 0d
BRASS Tubes	lb 2s 1½d
Sheet	lb 2s 4⅞d
Wire	lb 2s 7¾d
PHOSPHOR BRONZE	
Wire	lb 3s 7¾d
RUBBER, No. 1 R.S.S. spot ..	lb 50d

Southgate Horticultural Show

On the occasion of the Southgate & District Horticultural Society's 20th annual show, held at Broomfield Park, Southgate, on 31st August and 1st September, the Southgate and Wood Green District of the Eastern Electricity Board, Northmet Sub-Area, staged an attractive display in the trades marquee. This took the form of a modern kitchen and included a display of domestic electrical equipment. The theme of the exhibition was " How to make the most

The Eastern Electricity Board's display at the Southgate Horticultural Show

of your garden and allotment produce with the aid of electricity." In addition to the kitchen, an electric vehicle and an "Ice Lollipop" machine were shown. These are becoming increasingly popular and are sold and serviced by the Board.

Trade Announcements

Andrew Sloss & Co., manufacturers' agents, who have been Scottish agents for some time of the Armorduct Cable Co., Ltd., E.D.L., Ltd., and Messrs. Chilton (for their "Elt" trips) have opened a new office and stores at 15, Wellington Street, Glasgow, C.2 (telephone : Central 4170).

Smart & Brown (Engineers), Ltd., announce that the London branch sales office and trade counter for all "Hi-Craft" products are now at 8, Rose & Crown Yard, King Street, St. James Street, London, S.W.1 (telephone : Whitehall 8267/8).

Mr. G. Johnson, 57, Keswick Road, Sheldon, Birmingham, 26 (telephone : Sheldon 2245), has been appointed Birmingham and Midlands agent for the **Wardle Engineering Co., Ltd.**

School Electrical Installations

For the East Ham Education Authority's three secondary schools on one site at Langdon Crescent, Barking Road, all the electrical installation work is being carried out by Rashleigh Phipps & Co., Ltd. The project comprises a boys' grammar, girls' modern and a boys' modern school, accommodating a total of about 1,700 pupils, a central administration block, dining rooms and kitchens. Electricity supply will be obtained from a substation with two 500 kVA transformers. Crompton Parkinson, Ltd., are supplying 5,000 yd of paper insulated lead covered cable, seventy miles of v.i.r. cable, lamps, tubes and fluorescent lighting fittings. The schools were designed in the department of the borough engineer and surveyor, Mr. F. C. Ball, the chief assistant architect being Mr. J. W. Taylor. The general contractors are W. & C. French, Ltd., and E. Wingfield Bowles & Partners are the consultants for the mechanical and engineering services. The accompanying picture shows the pupils of the girls' modern school watching Crompton power cable being pulled in to give the main supply to each of the three schools.

Crompton cable being laid for East Ham secondary schools

Catalogues and Lists

British Thomson-Houston Co., Ltd., Rugby.—Technical brochure on the company's latest radar aids to marine navigation.

Lancashire Dynamo & Crypto, Ltd., Trafford Park, Manchester, 17.—Technical brochure on machine tool drives.

Crypto, Ltd., North Circular Road, London, N.W.10.—Illustrated brochure on the catering equipment at the South Bank Exhibition.

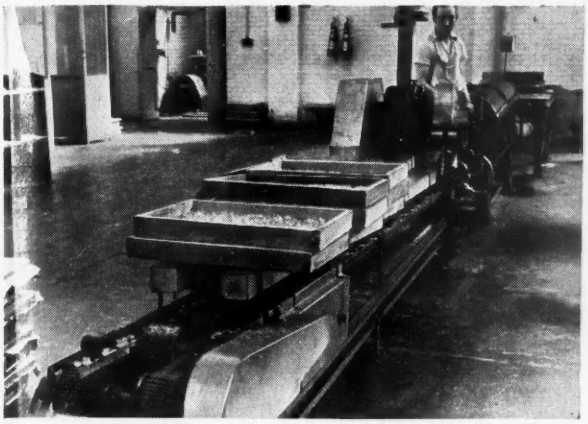
Sturtevant Engineering Co., Ltd., Southern House, Cannon Street, London, E.C.4.—Technical brochures on the "Precipitron" air filter; brick, tile and heavy clayware drying; and industrial vacuum cleaning.

Farm Electrification

THE report of a "productivity team" which visited the United States last year to study farming methods under the auspices of the Anglo-American Council on Productivity has been made available (2s 6d post free from the Council at 21, Tothill Street, London, S.W.1). In dealing with the development of farm machinery in the United States the report says that the American farmer has been greatly relieved of physical strain by the advent of electricity to farms, particularly in its application to hoists and elevators. Although these can be driven by petrol or paraffin engines, the loss in convenience as compared with electricity is considerable.

It is estimated that in this country not more than 40 per cent of farms have electricity; in the United States as a whole more than 85 per cent have mains electricity against only about 10 per cent in 1935. This rapid development is attributed largely to the Rural Electrification Administration which, since 1935, has helped to finance power plant and lines for providing electricity to rural users. It also assists in the provision of consumers' installations and appliances.

The report says that the success of the scheme is obvious. Among the recommendations is one urging that the electrification of farms in this country should be pressed forward by every possible means.



Left : **Production line for boiled sweets showing cooling conveyor in the foreground**

Below left : **Plastic material from the cone-shaped device being fed into the moulding machine**

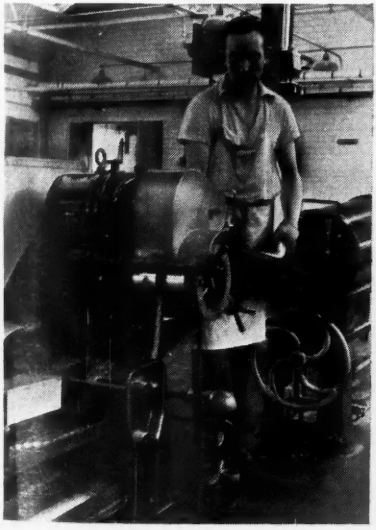
Below right : **Hobart mixer (with Ega plug-in starter) used for the preparation of the various ingredients**

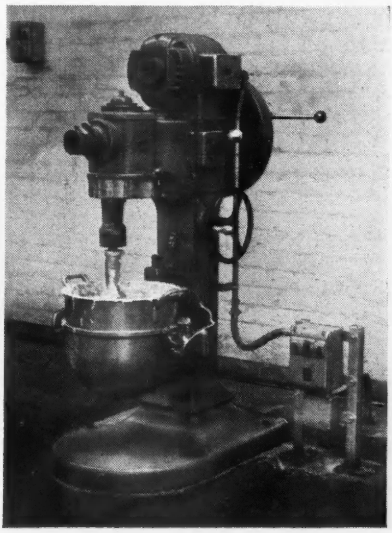
Confectionery Production

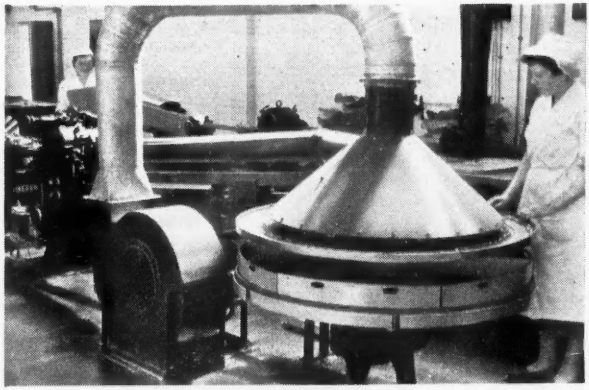
Electricity in High-Speed Hygienic Processes

THE factory of Heller, Ltd., at Bangor, Co. Down, was opened in March last year. It employs about eighty persons in the production of wrapped sweets of many different kinds. Electricity finds extensive applications throughout all the processes and contributes largely to the maintenance of the high standard of hygiene demanded by the company, as well as ensuring maximum output.

Faster boiling and a clearer mixture are secured by the use of vacuum pans for the



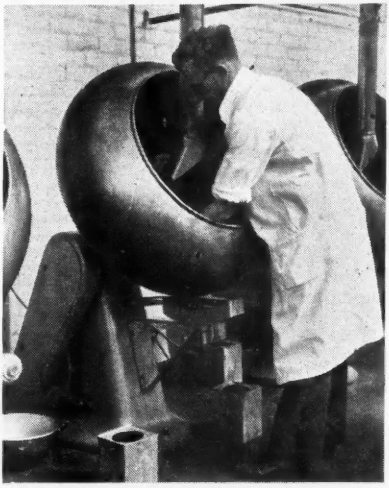




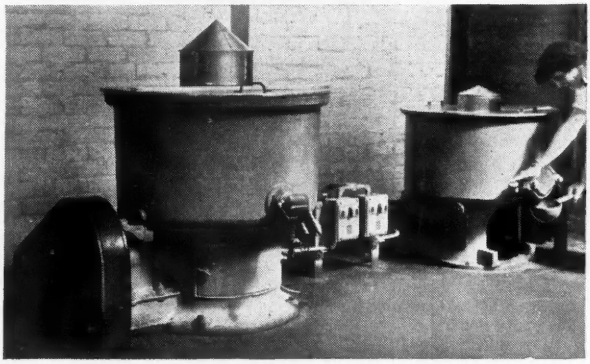
Bartlett three-way cooler driven by a 1 h.p. 1,425 r.p.m. motor

boiling of the sugar and glucose which form the ingredients of boiled sweets. After 10–12 minutes' boiling, during which it is kept in motion by agitators (driven by Laurence, Scott ¾ h.p. motors), the mixture is tipped on to cold slabs to cool.

Because of its high glucose content, the sugar remains plastic at a comparatively low temperature; it is transferred to a revolving cone-shaped device driven by a Crompton Parkinson ½ h.p. motor, and shaped into a strip before entering the moulding machine. If desired, jam or other fillings may be pumped into the hollow centre of the cone. In the die-head moulding machine the sweets are formed at the rate of about one cwt every 12–15 minutes, being discharged from the machine on to a conveyor.



Revolving pans in which dragees are coated with chocolate and (below) two of the chocolate kettles



Three of these production lines have been laid out. In one of them the conveyor from the moulder leads into a tunnel which is cooled by a current of air from a Keith Blackman fan (2–6 h.p. 2,850 r.p.m. motor). For the other two lines Bartlett three-way coolers driven by Laurence, Scott 1 h.p. 1,425 r.p.m. motors are employed.

From these coolers the sweets, still warm but no longer plastic, are taken direct to wrapping machines (Rose and Foregrove) and then straight into tins. Each of the wrapping machines can handle 150 sweets a minute and is driven by a motor running at about 1,425 r.p.m., that of the Rose

Sweets are wrapped at the rate of 150 per minute on this machine

machine being a B.T.H. 1 h.p. unit and that of the Foregrove equipment a Crompton Parkinson ½ h.p. motor.

Fondant centres for dragees, moulded in starch by means of a depositor (Neco 3 h.p. motor with Allen West starter) go to Manesty revolving pans in which they are chocolate coated. These pans are driven by Bull 1 h.p. motors fitted with "Auto-Memota" starters. The chocolate is prepared in Jahn and Bartlett kettles driven by Crompton Parkinson and Neco motors (1–2½ h.p.) respectively controlled by Ega plug-in starters. A Hobart mixer used to prepare the various ingredients is fitted with a 1 h.p. motor (also with an Ega starter). A G. P. Dennis main switch controls the supply to the factory with M.E.M. switch and fuse gear.

BRAZILIAN ELECTRICAL DEVELOPMENT

From Our Rio Correspondent

THE Rio Grande do Sul Government has signed contracts with two companies, one Belgian, the other Brazilian, for building and equipping a 20,000 kW thermal station at Candiota, in the south-east corner of the State. The immediate object is to supply power for railway electrification, but half of the capacity will be available for public distribution.

Representatives of the International Bank for Reconstruction and Development have visited Rio Grande do Sul in connection with the local Government's application for a $22 million loan. The loan is to be used to raise the capacity of the Jacui River station from 46,600 to 140,000 kW, and to link up three small stations in order to give a combined capacity of 60,000 kW. These projects form part of a ten-year programme to double installed capacity at a cost of £44 million. The first stage provides for sixteen small stations, of which ten, with a total capacity of 13,000 kW, have been completed. The remaining six, now under construction, will contribute 26,220 kW. One-quarter of the expenditure is being borne by the Federal Government, and the necessary equipment has been acquired, or ordered, in Sweden, France, Switzerland and the United States. The second stage of the programme includes six larger stations and twenty-two small thermal installations, with a total capacity of 99,600 kW.

Three companies have been organized by the Minas Geraes Government, with mixed State and private capital, to carry out electrical projects. The most recent of these, Cia. de Electricidade do Alto Rio Doce, with a capital of £7 million, will complete the central station, begun in 1949, at the Salte Falls on the San Antonio River, an affluent of the Upper Rio Doce. When completed, installed capacity will be raised from 100,000 to 200,000 kW in the State's most important industrial district. The majority of the steel mills, 50 per cent of the cement factories and 35 per cent of the

railroad repair shops are situated in this zone. The total cost of the work is estimated at £5,400,000, including hydro-electric equipment to the value of about £1,595,000.

The Economic Recovery Plan of the Minas Geraes Government quotes the following statistics:—Hydro-electric potential available within the State, 5,800,000 kW; installed capacity for public use, 170,000 kW; annual consumption of electricity, 433,000,000 kWh, or 56·81 kWh per head; annual consumption of wood, 24,000,000 cu metres. In order to improve the situation, facilitating industrial expansion and avoiding depletion of forest reserves, a special fund was created by the late Government to finance an electrification programme. The fund is to receive 3 per cent of the State's revenue from taxation, or approximately £530,000 annually, during fifteen years. The programme of works includes the projects mentioned in the *Electrical Review* of 1st and 29th June, the Salte station, referred to above, and a 36,200 kW station at the Itutinga Falls, on the Rio Grande. A proposal by Burns & Roe, New York, to build and equip the latter for $22 million is now before the State Government. The amount will be paid in fifteen years, at 4½ per cent interest per annum.

State-aided Private Schemes

Several private supply companies in Minas Geraes are increasing capacity with financial assistance from the State Treasury. One of these, operating at Teofilo Otoni, has recently ordered equipment in Germany. Brazil's growing importance as an international market has brought the representatives of several European manufacturers to Sao Paulo, Minas Geraes and other States in recent months.

Delegates from the Minas Geraes Government left for Paris in August to complete negotiations with the Impex group for a loan of $20 million. It will be employed to finance imports of electrical and other materials, required under the Recovery Plan.

As regards North Brazil a Bill has been tabled in the Chamber of Deputies, authorizing the Executive to subscribe half the capital of 100 million cruzeiros (£2 million) required to launch the Cia Força e Luz do Para S.A. This company is being organized at Belem, under the auspices of the State Government, to take over the lighting, power and tramway services of the Para Electric Company. The latter's long struggle to maintain the services under exceptionally difficult conditions ended in the cancellation of its concession by the late Government and the taking over by the State of its assets. Para's public services have since been increasingly unsatisfactory, in spite of the purchase of reconditioned generators in the United States and the new company will have to carry out extensive renewals.

British Firm's Contract

The Governor of Amazonas has applied to the Amazon Credit Bank for a loan to finance improvements to the Manaos light and power services. A British firm has obtained the contract for the necessary equipment and the first consignment of material is reported to be about to arrive from England.

The commission appointed to promote the development of the San Francisco Valley has nominated Servex Engenharia to carry out preliminary studies and elaborate a project for the utilization of the hydraulic power of the Corrente River and its tributaries, in Bahia. Four cataracts within the basin of the Corrente, an affluent of the left bank of the Middle San Francisco, have a combined potential of 60,000 h.p. The project, with estimates of cost, is to cover the building and equipping of main stations and substations, the erection of transmission lines to consuming centres and the investigation of other possible sources of electrical energy situated in the same zone.

The Hydro-electric Company of the San Francisco River, which is building a 120,000 kW station at the Paulo Afonso Falls, has ordered materials, including h.v. steel and aluminium cables, in Sweden. The value of the order amounts to 10 million kroner.

Machine Tool Exhibition

THE next international Machine Tool Exhibition will be held at Olympia, London, from 17th September to 4th October, 1952. It is being organized by the Machine Tool Trades Association, Victoria House, Southampton Row, London, W.C.1, which was responsible for the 1948 show in London as well as those held last year and this year in Toronto.

ELECTRICITY SUPPLY

Load Spreading in North-East

Improved Position in Scotland

INDUSTRIAL and commercial firms in the North-East are being asked to reduce by 40 per cent their electricity load between 8 a.m. and noon and between 4 p.m. and 5.30 p.m. for two months of the winter; for the other two months a 20 per cent cut is likely to be sufficient. Two means of spreading the load have been suggested. One is that firms should, in rotation, work one day weekly from noon to 4 p.m. This would mean the working of a Saturday morning shift to make up the 44 hours. The other proposal is that one shift weekly should be worked from noon to 9.30 p.m., so obviating the need for a Saturday shift. Each firm is being left to work out its own ideas to reduce the load at peak periods. Addressing Newcastle and Gateshead Chamber of Commerce, Mr. H. H. Mullens, chairman of the North Eastern Electricity Board, said there would be a deficit of 20–23 per cent in the electricity capacity in the area this winter. It would not be until 1955 that they would be able to cope with the load. By then they might have about 4 per cent available for "export" to other areas.

Scottish Power Prospects

Scotland's electricity position this winter is expected to be somewhat better than last year. A letter from the South East Scotland Electricity Board before the Area Consultative Council in Edinburgh on 3rd September stated that an appreciable amount of new steam plant would be in operation in time to meet the winter load, and a further increase in supplies would be available from the North of Scotland Hydro-Electric Board. Because the capacity of the grid lines linking Scotland with England was limited, less assistance would be given to England during peak load periods than would otherwise be the case. After taking into account all the relevant factors, it had finally been decided that all industrial consumers in South West and South East Scotland, together with all commercial consumers taking loads of 20 kW and over, should be required to reduce their demand by 20 per cent between the hours of 8 a.m. and noon and from 4 p.m. to 5.30 p.m. (Monday to Friday inclusive) from 1st November, 1951, to 29th February, 1952. From this it would be seen that load spreading would not be required in these areas during March.

In the South West of Scotland the first 50 MW set at Braehead is still undergoing trials and adjustments; the second is expected to come into commission before the winter and the third early next year. A 30 MW set recently came into operation at Clyde's Mill, on the upper reaches of the river, and a second will be in operation there within the next two months.

Unidirectional Lighting

It has been suggested that in city one-way streets the unidirectional system of lighting which has been adopted for many double-carriageway roads might be disturbing to pedestrians. In the case of a recent installation in Upper Brooke Street, Manchester, however, where a careful check has been kept on public

Unidirectional lighting with G.E.C. "Uniway" lanterns in Upper Brooke Street, Manchester

Blackpool's autumn illuminations switched on last week have been extended at a cost of some £60,000 this year. The illustration shows the Tower brilliantly outlined

reactions, there has been no adverse comment. Upper Brooke Street is a busy one-way thoroughfare near the city centre. The installation of 192 G.E.C. "Uniway" lanterns is now permanent. The lanterns are equipped with 125 W mercury lamps, and are mounted at 25ft with an average spacing of 120ft. The results are claimed to be practically indistinguishable from those obtained elsewhere in the city with 400 W lamps in conventional lanterns. The installation was planned and completed by the chief lighting engineer, Mr. H. F. Cork, A.M.I.E.E., under the direction of the city surveyor, Mr. R. Nicholas, C.B.E., B.Sc. The lanterns and auxiliary gear were supplied by the General Electric Co., Ltd.

Installations in Houses

Southport Estates Committee has received approval from the Ministry of Local Government and Planning for a loan for the installation of electricity in houses in Essex Road, Birkdale. The Committee gave an assurance that the original estimate of cost would not be exceeded. Tenders are being invited for the electrical work on the houses, and the Electricity Board is being asked for details of the cost of laying the cable.

Coal for North Tees

The collier *Dame Caroline Haslett* has brought the first cargo of seaborne coal to the Tees for the new extensions to North Tees power station. The cargo was 2,650 tons from Blyth. The power station extensions are due to come into operation this winter.

Board Criticized

Discussing the supply of electricity to a Berwickshire farm, in which difficulties had arisen between the farmer and the Board, several members of the South East Scotland Electricity Consultative Council expressed dissatisfaction with the Board alleging failure to keep promises, inaccurate statements, and undue delay in the carrying out of work. Mr. J. M. Airlie, chairman of the Council, who had visited the farm and examined the farmer's case, said he was satisfied that the Board's letter was not by any means accurate. In the carrying out of electricity supply work, completion was delayed from time to time, and assurances from the Board about the date of installation did not always turn out to be accurate. Mr. Airlie said he had come to the conclusion that too many jobs were in one contractor's hands.

Austrian Hydro-Electric Scheme

In connection with a visit by the Iron and Steel Institute to Austria this month details are given in the *Iron and Coal Trades Review* of a number of industrial enterprises in the area to be visited. They include a hydro-electric development at Kaprun. The first and main stage, now almost completed, comprises two 45,000 kW generators now in operation and two 55,000 kW units which should be installed by the end of the year. The upper station will have a capacity of 100,000 kW and is designed to be ready by the end of 1954. The power production of the entire project is estimated at 600 million kWh annually.

Service Charges

Durham County Education Committee has protested to the North Eastern Electricity Board against the "apparently high service charges" notified to the Committee in respect of certain projects for installing electricity in schools.

Television Relays

Brighton Town Council is being asked to approve a television relay service, for which purpose a station with a 60ft steel mast would be set up on top of the Devil's Dyke.

The Seaton Valley Relay Co., Ltd., Northumberland, is seeking sanction to build a 100ft television mast at Seaton Delaval to obtain programmes from the Holme Moss station.

RECENT INTRODUCTIONS

NOTES ON NEW ELECTRICAL AND ALLIED PRODUCTS

Spindle Screwing Machine

AN addition to the products of CHAMBERLAIN INDUSTRIES, LTD., Staffa Road, London, E.10, is the "Staffa" ⅜in single spindle screwing machine. This compact and self-contained machine is intended for the accurate high speed threading of bolts, pipes and many other small components. It is V-belt driven by a 0·75 h.p. protected motor and can be supplied with or without a die head and self-centring vice according to customers' requirements.

Bakelite-Cased Water Heater

BERRY'S ELECTRIC, LTD., Touchbutton House, Newman Street, London, W.1, inform us that their 1½ gall "New Look" water heater will in future be manufactured with a moulded Bakelite outer container. This is a progressive development in the construction of storage water heaters, as well as an important factor in the saving of scarce metals required for rearmament. The interior specification and efficiency remain unimpaired, and the heater will continue to be supplied in four finishes—pastel green, cream, white and pastel blue. The Bakelite outer container is claimed to provide complete electrical and thermal insulation.

Instrument Mounting

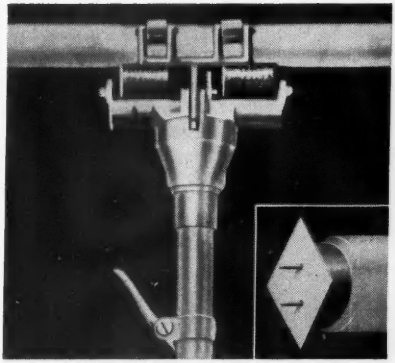
The outcome of the comprehensive programme of instrument development on which the ENGLISH ELECTRIC CO., LTD., Stafford, is engaged is a new range of switchboard instruments. The first items to become available include ammeters and voltmeters, a.c. moving iron type and moving coil d.c. permanent magnet type, which are obtainable in the nominal 4in and 6in sizes; there are also 6in single-phase and polyphase electro-dynamometer types of wattmeter.

All these instruments can be had in cases of round or square pattern and the bar-type pointer moves over a bold scale. The latter is marked with a clear single symbol (A, V, kW, etc.) which is the only marking within the indication arc. This feature is of particular value in power stations and area control rooms, where a clear view of the dial is required from the control engineer's desk.

The company has a newly patented method of flush-mounting this range of instruments. The case is fitted into the panel from the front, it being frictionally held in position by leaf springs on the case. Installation is completed by the insertion of clamp plates and fixing screws.

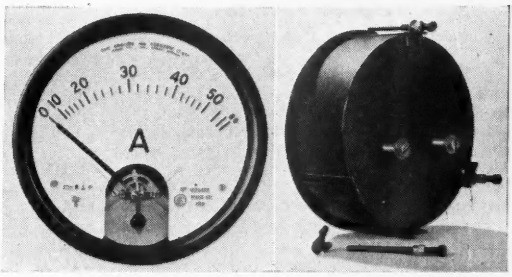
Fluorescent Lamp Changer

In addition to its "No-Climb" lamp changer, which expedites the replacement of bulbs by avoiding the use of ladders, a variant for dealing with bi-pin fluorescent lamps is now being made by CABLE STRIPPERS, LTD., Leighton House, Potters Bar, Middlesex.



"No-Climb" fluorescent lamp changer with (inset) tell-tale disc on cap pins

Flush mounting English Electric 6in a.c. ammeter and reverse view of case showing leaf springs for fixing in panel



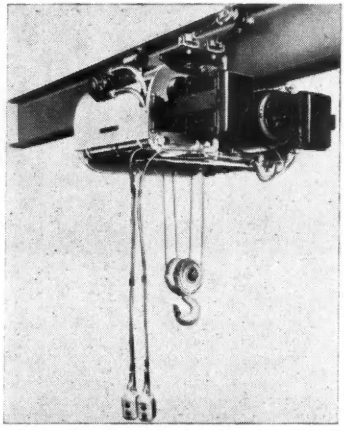
It is similarly constructed of a hollow aluminium pole; instead of a claw-grip the pole-head has six rubber-cushioned rollers (drivers and idlers) which are opened by an upper lever on the pole to grip the lamp securely. The pole is raised to insert the lamp in the fitting and the lamp is rotated sufficiently, usually not more than 90 deg, to engage the bi-pin caps with the lampholders.

Release of the lamp is by a second lever at the lower end of the pole. Rotation is by a rubber knob at the extremity and geared rod up the hollow pole. The amount of rotation needed, less than 90 deg either way, is gauged visually by the positions of the corners of a "tell-tale" disc fitted over the cap pins (as illustrated) which remains in position when the lamp is secured.

The thin ivorine washer takes up little room and aids lamp removal, which can be done with the pole held at angles up to 45 deg from the vertical to avoid climbing on to machinery over which lamps may be fixed or chain-suspended. The pole can be lengthened by extension pieces.

Travelling Hoists

The travel motion of electric hoists made by the TAYLOR STOKER CO., LTD., 189, Drummond Street, Euston, London, N.W.1, has been



Motor driven trolley type "Lo-Hed" hoist

redesigned to lower the cost, by £100 in the case of the larger sizes, and much reduce the headroom needed.

Instead of the load bar that carried the hoist and was suspended from trolley wheels, a standard "Lo-Hed" hoist is now mounted with its normal trolley wheels on the track, the trolley drive being built into the frame. In this way 8in extra height of lift has been obtained. The main motor (seen at the right of the illustration) is coupled to an oil pump inside the hoist connected to a smaller motor (seen on the left) which drives a spur pinion meshing with a pair of the trolley wheels. The fluid drive elements are rotary vane pumps, the transmission system being fitted with a small oil reservoir and non-return valves.

The transmission automatically forms its own brake by the oil pressure in the system. The drive is reversible simply by pressing the appropriate button of the pendant control box. The standard travelling speed for hoists up to 3 tons capacity is 100 ft/min, but other speeds can be arranged. The hoist can be operated for hoisting and for travelling, either by pendant push-buttons or by push-buttons at any number of distant points, or a combination of both.

Storage Heater

A thermal storage space warmer, suitable both for household use and in such premises as hotels and public halls, may be employed either as a plain storage radiator, a convector storage heater, or straight convector, depending upon the position of a shutter controlling the warm air outlet. Moving the control knob to one of three positions is all that is needed to make the change.

This "Airflo" device radiates heat all the time and discharges warm air at any time of the day or night immediately the shutter is opened. It is a product of LUMITE, LTD., Blackhall Parade, Dublin.

The sheet steel container is heat insulated with glass wool slabs. Within the insulated portion are two ducts, open at the bottom to admit air and closed at the top by means of a multi-position shutter. The ducts are provided with fins; the spaces between the latter and those surrounding the ducts are filled with "copestone," a treated form of soapstone. The heating elements are alloy wire wound on ceramic formers and centrally disposed in the air ducts; they can be easily removed.

The fins surrounding the ducts assist transference of heat from the elements to the "copestone," which is the storage medium, with the reverse effect when the air exit shutter is opened.

When the "copestone" is fully charged with heat dissipation by radiation is gradual over a 15-hour period with the air shutter closed, or over an 11-hour period with the convection shutter open. The heater may be transported empty and filled with powdered "copestone" on site.

Dock Electrification

THE Docks and Inland Waterways Executive has adopted a five-year scheme for the electrification (to replace the steam pumping and hydraulic plant) of docks at Swansea (to cost £230,000), Cardiff (£190,000) and Newport (£100,000).

FINANCIAL SECTION

Company Notes and Stock Exchange Activities

Reports and Dividends

George Cohen, Sons & Co., Ltd., report group profits for the year ended 31st March last of £868,085, as compared with £352,598 for the preceding year. Taxation absorbs £525,853 (£223,229), and after deducting £10,249, proportion of profits applicable to minority shareholders, the net profit attributable to members of the holding company is £331,983 (£128,823). Of this £134,957 is retained by subsidiary companies, leaving, with the balance of £65,404 brought in, £262,430 available. It is proposed to pay a final dividend on the ordinary stock of 15 per cent (against 12 per cent), making 23 per cent for the year (against 20 per cent). A sum of £21,948 is applied to writing off cost of inauguration of extension to pension scheme, and £64,000 is transferred to general reserve. The balance carried forward is £65,707.

In his statement which accompanies the report, Mr. C. M. Cohen (chairman and managing director) says that the improvement was most marked in their merchanting organizations, where they experienced a large increase in demand for capital goods. Their manufacturing plants continue to extend the range and scope of their products and orders on hand have reached a record level. The report contains a number of excellent illustrations showing the various activities of the group.

Thorn Electrical Industries, Ltd.—The annual meeting was held on 7th September, Mr. J. Thorn (chairman and managing director) presiding. In the course of his speech the chairman referred to the silver jubilee of the company. Their sales had considerably increased during the year under review, and one of the important results of the work of their research personnel was that they were now able to announce the doubling of the guaranteed life of their fluorescent tubes to an average life of 5,000 hr. Their dimmer controlled fluorescent lighting equipment had won increasing acceptance and this lighting had been used to illuminate 3½ acres of the Battersea Park Festival Gardens. To-day they operated five lamp factories, all of which were working to capacity. The Ferguson radio and T.V. division had made substantial progress, and despite increased manufacturing capacity, had been unable to keep pace with demand. During the past year export sales had again substantially increased, and in addition to being the largest exporters of fluorescent lamps they were now the largest exporters of fluorescent control gear and starter switches.

The Palestine Electric Corporation, Ltd., reports a net profit for 1950 of I£208,620, as compared with I£170,689 for 1949, after meeting all charges, including I£255,000 for taxation. It is proposed to pay a dividend for the year of 5 per cent, free of tax, on the ordinary and " A " ordinary, as increased last March by a rights issue of 800,000 ordinary shares to holders on the London register and an offer of 224,424 ordinary shares to holders on the Palestine register. A similar dividend was paid for 1949 on the smaller capital. The balance carried forward is I£323,447 (against I£288,519 brought in). It is proposed to increase the authorized capital from £4 million to £8 million by the creation of £4 million new shares of £1 sterling each. An issue of 250,000 ordinary shares of £1 sterling each on the Israel register, at par, to the trustees of the Corporation's staff pensions fund is intended. An extraordinary meeting will be held in London on 28th September.

Eveready South Africa, Ltd., reports a net profit for the year ended 30th June last, after charging £11,841 for depreciation and £30,800 for taxation, of £81,110, as compared with £79,731 for 1949-50. The dividend for the year is unchanged at 30 per cent.

The Nico Light Engineering Co., Ltd., reports a net profit for the year ended 31st March last of £9,622, as compared with £9,766, after meeting all charges, including £13,378 for taxation. The dividend for the year is maintained at 10 per cent, but the bonus is raised from 5 to 7½ per cent, making 17½ per cent for the year (against 15 per cent). The balance carried forward is £7,454 (against £7,369 brought in).

A. H. Hunt, Ltd.—Kleinwort Sons & Co., Ltd., announce that shareholders took up 99,311 of the 100,000 new ordinary 4s shares recently offered to them at 10s per share.

Walsall Conduits, Ltd., has declared an unchanged interim dividend of 20 per cent.

Strand Electric Holdings, Ltd., proposes to pay an unchanged ordinary dividend for the year of 17½ per cent.

New Companies

Hadley Sound Equipments, Ltd.—Registered 31st August. Capital £12,500. Manufacturers and repairers of and wholesale and retail dealers in all kinds of goods, radio receivers and transmitters, television sets and sound reproducing machines, etc. Directors : V. J. Hadley and N. C. Hadley. Regd. office : 72, Cape Hill, Smethwick, Staffs.

Channing Milbourne, Ltd.—Registered 31st August. Capital £1,000. Electrical and general engineers and contractors, etc. Directors : H. C. Quitmann, Mrs. J. J. Quitmann and Miss Hilda M. Quitmann. Regd. office : 19-21, Newbury Street, Aldersgate Street, E.C.1.

Home Maintenance, Ltd.—Registered 1st September. Capital £100. Repair and maintenance service for radio and television apparatus, gramophones, and electrical apparatus, etc. Subscribers : F. J. Groombridge and H. L. Armstrong. Solicitors : Herbert Smith & Co., 62, London Wall, E.C.

Luceo (Lampshades), Ltd.—Registered 3rd August. Capital £2,000. Manufacturers of and dealers in lampshades and other electrical or gas appliances, etc. Directors : C. A. G. Blattman and G. M. S. Baker. Regd. office : 75, High Street, Hampton Hill, Middlesex.

Instruments & Controls (J. L. Record), Ltd.—Registered 25th August. Capital £3,000. To acquire the business of a manufacturer and repairer of and dealer in measuring instruments, control gear and electrical and electronic apparatus and accessories, carried on by J. L. R. Record at Altrincham. Directors : J. L. R. Record and R. E. Everett. The last named is deemed to have been appointed by Everett Edgcumbe & Co., Ltd., who have the right to nominate one director so long as they hold one third of the issued shares. Regd. office : 3, Sandiway Place, Manchester Road, Altrincham.

Direct Magnetic Transmissions, Ltd.—Registered 28th August. Capital £100. Telephone, telegraph, cable and wireless communication company, etc. V. A. Foot is the first director. Secretary : V. Walker. Regd. office : 40, Pall Mall, S.W.1.

H. Howell & Co., Ltd.—Registered 30th August. Capital £500. Electrical, constructional, radio, television and general engineers, etc. Directors : H. Howell and Mrs. Alice E. E. Howell. Regd. office : 90, North Street, Gosport, Hants.

Increases of Capital

A. H. Hunt, Ltd.—Increased by £75,000, in 4s ordinary shares, beyond the registered capital of £125,000.

Southport Electrical Services, Ltd.—Increased by £6,500, in £1 ordinary shares, beyond the registered capital of £3,500.

Ward & Goldstone, Ltd.—Increased by £100,000, in 5s ordinary shares, beyond the registered capital of £200,000.

Scottish Cables, Ltd.—Increased by £350,000, in 4s ordinary shares, beyond the registered capital of £550,000.

Electrical Trades Supply, Ltd.—Increased by £10,000, in £1 ordinary shares, beyond the registered capital of £5,000.

Liquidations

E. Clarke (Electrical), Ltd. (in voluntary liquidation).—Meetings of members and creditors on 11th October at 22, Birley Street, Blackpool, to receive an account of the winding-up by the liquidator, Mr. M. Naylor.

Mid-Cheshire Auto-Electric & Battery Service, Ltd. (in voluntary liquidation).—Meetings of members and creditors on 17th October at the board room of Harry L. Price & Co., 47, Mosley Street, Manchester, to receive an account of the winding-up by the liquidator, Mr. G. H. Eaves.

Holland's Electrical Exports

ALL the leading lines of Holland's electrical export trade increased last year on 1949. A few of the higher value groups in 1950 are listed in the accompanying table with notes of increases and decreases on 1949 and the chief customer countries. Countries of destination are not specified in the official statistics for the progressive trade in lamps and radio goods; that in receiving sets jumped in value in 1950 to 78,525,000 guilders, against 55,189,000 guilders in 1949. In addition to these two big groups and those shown in the table Holland is also an exporter of instruments and meters, regulating and distributing apparatus, installation material and domestic appliances. (The Dutch guilder is about 2s.)

Class of Goods	1950 Gld. (000)	Inc. or dec. on 1949 Gld. (000)
Motors over 10 kg	3,386	+ 1,027
To Belgium-Luxemburg	1,366	+ 580
„ Indonesia	774	− 280
Transformers over 10 kg	1,962	+ 1,094
To West Germany	817	+ 799
„ Indonesia	440	+ 323
Static convertors over 10 kg	1,607	+ 118
To Belgium-Luxemburg	375	+ 237
„ Indonesia	366	− 412
Vacuum cleaners	6,208	+ 2,285
To Belgium-Luxemburg	1,334	+ 610
„ Sweden	1,274	+ 83
„ Switzerland	1,103	+ 739
Telephone apparatus	5,651	+ 3,206
To Greece	2,367	+ 2,125
„ Peru	544	+ 544
Loudspeakers, microphones, etc.	4,649	+ 33
To Brazil	1,031	+ 564

STOCKS and SHARES

STOCK Exchange business is gradually getting into its more normal stride now that the holiday season is nearly at an end. The various handicaps upon business imposed by foreign politics and suggested domestic legislation continue to lay a restraining hand upon private enterprise in the matter of investment, but the manner in which prices are maintained in most markets bears witness to the steady support that derives from the flow of money into markets round the House. A substantial rise in the price of rubber has brought the rubber share market again into prominence. The most active centre at the moment is the market for foreign government bonds, more particularly, of course, Japanese and German.

New A.E.I. Shares

Of the issues arising out of the conversion offer (which is open until the end of this month) to holders of Associated Electrical Industries 8 per cent preference stock, the new 4½ per cent "B" preference shares are available in the market of about 21s, and can be bought free of the 2 per cent transfer stamp duty until the last "renunciation" date on the 28th of this month. The yield is £4 5s 9d per cent, a matter of 5s per cent more than the present return from War Loan. The new £1 ordinary shares, offered at 20s to those holders of the old preference stock who accept the conversion proposition, are quoted at a premium of 66s, with 1s per share paid up, and the final amount of 19s per share due to be paid by the end of next month. At the total cost of 86s (also free of stamp), the shares would pay a little over 4 per cent on the money on the basis of the "standard" dividend of 17½ per cent, which will apparently apply if the dividend control proposals become law.

Thorn Electrical Dividends

At the annual meeting of Thorn Electrical Industries held a week ago, the chairman disclosed that it had been the board's intention to recommend an increase in the dividend from 10 to 12½ per cent. As it happened, the Chancellor of the Exchequer produced his control proposals on the day before the company's final accounts were passed. In the circumstances, the payment is being kept down to 10 per cent, which is equivalent to the 20 per cent distributions of the two previous years, on half the present ordinary capital of £529,000. Mr. Thorn points out that an extra 2½ per cent would have meant the distribution of under £6,000 net out of a practically three-fold rise in net profits, which exceeded £150,000 after tax. The board intends to implement the original decision as soon as it is practicable to do so. Expansion is evident in all sections of the full report. The 5s ordinary shares stand at about 10s.

Hackbridge Cable Holdings

Hackbridge Cable 5s ordinary shares are quoted now at 13s *ex* the 12½ per cent final dividend declared at the end of last month. This payment brought up the total for the year to the rate of 20 per cent paid since the company was registered three years ago. On this occasion it is less well covered than was the case previously. In his statement accompanying the annual report, the chairman speaks of an extremely difficult trading year, with special reference to the raw material position. This, he says, dominates future prospects, and, if shortages persist, it may be difficult to maintain last year's output. Turnover in the opening months of the current period is said to have improved substantially, but at the expense of running down the stocks of materials. Last year's reduced rate of profits is felt by the board to be purely temporary. The yield on the shares works out at £7 14s per cent.

Dollar Stocks

Canadian securities remain an active market, at rising prices. Interest, aroused originally by a growing appreciation of the Alberta oilfield discoveries, is spreading to include many industrials and utilities. The electric power companies whose shares are quoted in London retain their popularity with investors in this country. Momentum was, of course, imparted to the movement by the wish to escape Government control of dividends at home. Shawinigan Power shares are noticeably in demand at present, the price having risen some eight points in the past month to $80. British Columbia Power "A" shares are $61. There is also a revival of interest in some American securities which used to be familiar names here before the war. Despite the premium of about 20 per cent included in London prices, yields compare reasonably with their opposite numbers at home.

Week's Price Changes

C. A. Parsons at £5 are prominent with a rise of 2s 6d. Siemens at 45s, are 1/16 better. Rises of 6d each occurred in British Insulated Callender's, 33s, British Vacuum, 17s 6d, Hall Telephone, 13s 6d and Anglo-Portuguese Telephone 25s. The radio shares show little change. E. K. Cole are the pence better at 21s 6d. On the other side of the sheet, Lancashire Dynamo, 5¼, are 1/16 lower, and Burco, 24s, De la Rue, 34s 6d, and Globe Telegraph, 25s, are all 6d down as compared with a week ago.

NEW BOOKS

Polyphase Commutator Machines. By B. Adkins and W. J. Gibbs. Pp. 220; figs. 125; index. Cambridge University Press, Bentley House, London, N.W.1. Price 21s.

There is abundant evidence that a.c. commutator motors are being used to an increasing extent and, while most electrical engineers have a general knowledge of such machines, it is probable that only a small percentage understand them as fully as the older types of motors. This authoritative book includes both practice and theory, consequently it will be useful to a wide range of readers from works engineers to students.

The subject is introduced by discussing the operation of the induction motor and describing the effect of voltage injection into the secondary circuit. This is followed by a classification of types of windings and simple formulæ relating to induced voltages, m.m.f. and compensating windings. Thirty-nine pages are devoted to the important subject of commutation. Three chapters on polyphase shunt and series motors, the commutator frequency changer and the Schrage motor, and the Scherbius machine, delve into these subjects in some detail and include theory, characteristics and control of such machines. Phase advancers and compensated motors are dealt with in a separate chapter, while the concluding chapter is concerned with the application of polyphase machines in various industries, these being illustrated by several photographs at the end of the book.

It will be seen that the book has a wide scope; it is clearly written and well illustrated by vector and other diagrams and should be popular.—J.L.W.

Gas Turbine Manual. By R. J. Welsh and G. Waller. Pp. 243; figs. 113; appendices, bibliography and index. Temple Press, Ltd., Bowling Green Lane, London, E.C.1. Price 25s.

Many books are available which deal with gas turbines but some of them are severely specialized, while others treat the subject in the light of the state of development in one particular part of the world. This volume, however, presents an authoritative and up-to-date world picture of development, written in a non-mathematical fashion particularly for the needs of those readers who are potential users of this form of power for industry; it does not deal with gas turbines for aircraft.

Full details are given of all the important machines so far built, together with particulars of others under construction and there are separate chapters on power station, locomotive and marine applications. There is also a glossary of gas turbine terms, extensive bibliographical references and tabulated design data on some 50 British and foreign gas turbine installations.—R.P.

Guide to Broadcasting Stations. Pp. 94. *Wireless World*, Dorset House, Stamford Street, London, S.E.1. Price 2s.

Despite international efforts, the congestion in the long- and medium-wave broadcasting bands in Europe is eased but very little. There are at present nearly 200 stations working on unauthorized frequencies. Operating details of these stations and of the 350 or more authorized transmitters are embodied in this sixth edition of the Guide which also includes details of over 1,400 short-wave broadcasting stations operating in 117 countries. All the stations are listed both geographically and in order of frequency. Details are given of nearly 50 v.h.f. European broadcasting stations, fourteen European television transmitters, etc. There is much other allied information.

Work Study and Incentives. By. A. J. Speakman. Pp. 90; figs. 10. Emmott & Co., Ltd., 31, King Street West, Manchester, 3. Price 4s.

This is No. 63 in the series of *Mechanical World* monographs. The subject of work study occupies most of the book and such matters as production control, material handling, job methods, motion study, industrial fatigue and job evaluation are dealt with. These factors are then applied in a chapter on incentives in which methods of determining basic rates are studied and systems of payment are compared.

The monograph should be very useful to those endeavouring to stimulate production, that is, most industrialists.—J.H.C.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s each) will be obtainable after 24th October from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1947

955. British Telecommunications Research, Ltd., and Dain, G. T.—Telegraph systems. 12th September, 1947. (659733.)

18828. British Thomson-Houston Co., Ltd.—Evacuating and gas charging apparatus. 15th July, 1947. (659735.)

23091. Standard Telephones & Cables, Ltd.—Electron-discharge devices. 20th August, 1947. (659737.)

30222. Akt.-Ges. Brown, Boveri & Cie.—Magnetic induction accelerator. 13th November, 1947. (659739.)

1948

2283. Watliff Co., Ltd., and Vickery, E. H. W.—Commutators. 26th January, 1949. (659744.)

17346. Radio Corporation of America.—Modulator. 28th June, 1948. (659756.)

27826. General Electric Co., Ltd., and Morris, G. G.—Cooling arrangements for electric transformers. 26th October, 1949. (659391.)

28798. Shepherd, G. R. (Westinghouse Electric International Co.).—Electrostatic dust precipitation apparatus. 5th November, 1948. (Convention date not granted.) (659760.)

30545. Metropolitan-Vickers Electrical Co., Ltd., Belsey, F. H., and Wilson, J. S.—Saturable core reactance devices. 24th November, 1949. (Cognate application 10373, 19th April, 1949.) (659762.)

32066. Primavesi, D.—Process for obtaining and depositing electrolytic iron. 10th December, 1948. (659574.)

33225. Standard Telephones & Cables, Ltd.—Electric transmission circuits having non-linear amplitude transfer characteristics. 24th December, 1948. (659576.)

33531. Metropolitan-Vickers Electrical Co., Ltd. (General Electric Co.).—Apparatus for accelerating charged particles. 30th December, 1948. (659769.)

33606. Quiz Electrics, Ltd., and Jupe, G.—Warm air hand dryers. 21st November, 1949. (659399.)

1949

556. Libois, L. J.—Pulse distributor circuits. 7th January, 1949. (659770.)

1289. Metropolitan-Vickers Electrical Co., Ltd.—Weighing machines. 16th January, 1950. (659305.)

1422. British Mechanical Productions, Ltd., and Shorey, L. W.—Electric switches. 11th January, 1950. (659772.)

1519. Siemens Bros. & Co., Ltd., and Hailey, A. M.—Electrically operated changing display indicators. 13th January, 1950. (659309.)

1602. Chance Bros., Ltd.—Rotary electric switches. 9th January, 1950. (659409.)

1930. Marconi's Wireless Telegraph Co., Ltd., and Clough, N. H.—Driving mechanisms of intermittently varying speed. 24th January, 1949. (659415.)

1932. Minister of Supply.—Electrical delay networks. 8th February, 1950. (659416.)

1988. E. K. Cole, Ltd., and Smith, S. T.—Electrical connectors. 24th January, 1950. (659316.)

2332. Cinch Manufacturing Corporation.—Sockets for thermionic valves, electric connector plugs and like electrical devices having projecting prongs. 27th January, 1949. (659618.)

2755. Soc. Anon. pour les Applications de l'Electricité et de Gaz Rares-Etablissements Claude-Paz et Silva.—Heating device for tubular electric discharge lamps and the like. 1st February, 1949. (659321.)

2786. Colvern, Ltd., and Collinson, R. F.—Rotary wire-wound potentiometers and variable resistors. 30th January, 1950. (659778.)

3130. Philco Corporation.—Relaxation oscillators. 4th February, 1949. (659425.)

3341. Jacobs, H.—Devices for testing for faults in photographic flash bulbs, electric incandescent lamps, and the like. 3rd February, 1950. (659621.)

3345. Communications Patents, Ltd., and Adorian, P.—Wired broadcasting systems. 7th February, 1950. (659622.)

3600. Kingsbury, H. E. R., and Preece, J.—Electric switches adapted for insertion in electric conductors. 3rd February, 1950. (659323.)

3742. Soc. d'Etudes et de Participations Eau Gaz Electricité Energie Soc. Anon.—Plants including at least one free piston auto-generator and one gas turbine. 10th February, 1949. (659428.)

4135. British Thomson-Houston Co., Ltd.—Oven ventilation for ranges. 15th February, 1949. (659430.)

4537. United Insulator Co., Ltd., and Armer, H. L.—Manufacture of electric capacitors. 17th February, 1950. (659433.)

4680. Philips Electrical, Ltd.—Shaft positioning mechanisms. 21st February, 1949. (659783.)

4693. Westinghouse Electric International Co.—Moving stairways. 21st February, 1949. (659325.)

5023. Automatic Telephone & Electric Co., Ltd.—Telephone transmission systems. 25th January, 1950. (659629.)

5251. Metropolitan-Vickers Electrical Co., Ltd.—Electric strobing circuits. 15th February, 1950. (659437.)

5423. Hazeltine Corporation.—Super-regenerative wave-signal translating system. 28th February, 1949. (659785.)

5590. British Thomson-Houston Co., Ltd.—Fluorinated organopolysiloxanes. 1st March, 1949. (659439.)

5774. Arnold, J. C. (H. H. Robertson Co.).—Underfloor wire distributing system. 2nd March, 1949. (659441.)

5865. Telefonaktiebolaget L. M. Ericsson.—Device for automatic signalling in railway line block systems. 3rd March, 1949. (659500.)

5976. Wallace & Tiernan Products, Inc.—Method of maintaining chemical characteristics of liquids and an electrical cell apparatus therefor. 4th March, 1949. (659789.)

6291. British Thomson-Houston Co., Ltd.—Heat-curable elastic compositions. 8th March, 1949. (659445.)

7019. Babcock & Wilcox, Ltd.—Ignition apparatus. 15th March, 1949. (659328.)

7098. General Electric Co., Ltd., Harris, N. L., and Neill, T. R.—Pulse radar systems. 14th March, 1950. (659502.)

7451. Cinch Manufacturing Corporation.—Electrical socket connectors. 18th March, 1949. (659447.)

8049. Westinghouse Electric International Co.—Lead-in assemblies for evacuated containers. 24th March, 1949. (659642.)

8083. British Thomson-Houston Co., Ltd.—Combined shut-off and throttling valve assemblies. 24th March, 1949. (659643.)

8295. British Broadcasting Corporation, and Davies, H.—Pick-ups for reproducing recorded sound. 17th March, 1950. (659644.)

8915. Philips Electrical, Ltd.—Flashlight lamps. 1st April, 1949. (659332.)

9283. Saia Akt.-Ges. für Schaltapparate, and Buser, T. —Electric control of temperature and other conditions by means of condition-responsive contact-carrying instruments. 5th April, 1949. (659449.)

9614. Philips Electrical, Ltd.—Electrical valve oscillators. 8th April, 1949. (659450.)

10127. Westinghouse Brake & Signal Co., Ltd., and Simmons, A. W.—Electro-pneumatic braking apparatus. 25th January, 1950. (659647.)

10180. Mond Nickel Co., Ltd.—Electrodeposition of nickel. 14th April, 1949. (659335.)

10369. Saia Akt.-Ges. für Schaltapparate, and Buser, T. —Electric control systems, particularly for regulating temperature. 19th April, 1949. (659337.)

10888. Tempret Products, Inc.—Electrical heating unit. 25th April, 1949. (659343.)

11134. Austin Mills, Ltd., and Taylor, W.—Electric isolator switches or switch fuses. 12th April, 1950. (659454.)

11271. Elektrokemisk Aktieselskapet.—Continuous self-baking electrodes. 28th April, 1949. (659509.)

11879. Kruse, A. O.—Electric water heaters. 4th May, 1949. (Cognate application 11880, 25th April, 1949.) (659352.)

11922. Mullard Radio Valve Co., Ltd., and Noltingk, B. E.—Electro-acoustic transducers. 4th May, 1949. (659455.)

12889. Noyes, R. C. (Lundberg Explorations, Ltd.).—Intensity, intensity ratio and phase difference measuring system for geophysical prospecting. 13th May, 1949. (659458.)

13620. Petcar Research Corporation.—Fire resistant electrical cable. 21st May, 1949. (659521.)

13872. Aktieselskapet Proton, and Morch, J.—High-voltage isolating switch. 24th May, 1949. (659360.)

14647. W. Jessop & Sons, Ltd.—Permanent magnets. 1st June, 1949. (659527.)

14727. British Thomson-Houston Co., Ltd., and Hibberd, R. G.—Measurement of magnetic field strength by the use of a material exhibiting the Hall effect. 5th April, 1950. (659653.)

15295. British Thomson-Houston Co., Ltd.—Magnetic wire measuring devices. 8th June, 1949. (659465.)

15504. Continental Silver Co., Inc.—Temperature control circuits. 10th June, 1949. (659658.)

16198. Christiania Spigerverk.—Warning device for cooling-water system for transformers. 17th June, 1949. (659365.)

16222. Fidenza Soc. Anon. Vetraria.—Electrical insulator devices. 17th June, 1949. (659537.)

16731. Automatic Totalisators, Ltd.—Balanced armature polarized relay. 23rd June, 1949. (659662.)

17334. Hoover, Ltd.—Suction cleaners. 30th June, 1949. (659664.)

17868. Lindberg Engineering Co.—Electric induction furnaces. 6th July, 1949. (659366.)

18639. Sylvania Electric Products, Inc.—Detector for frequency-modulated and like signals. 14th July, 1949. (659544.)

18687. Standard Telephones & Cables, Ltd., Grayson, H., and Dunkley, R. A. G.—Electric frequency discriminators. 15th July, 1949. (659469.)

19632. Process Control Gear, Ltd., and Allwood, R. H. —Electric handlamps. 26th July, 1949. (659547.)

19885. Radio Corporation of America.—Impedance measuring devices. 28th July, 1949. (659550.)

20111. Sulzer Freres Soc. Anon.—Rotors for turbines or axial flow compressors. 2nd August, 1949. (659592.)

20113. British Thomson-Houston Co., Ltd.—Heating of electric motors while the machines are inoperative. 2nd August, 1949. (659673.)

21006. Compagnie pour la Fabrication des Compteurs et Matériel d'Usines à Gaz.—Television or like systems. 12th August, 1949. (Cognate application 21007, 1st December, 1948.) (659596.)

21024. Philips Electrical, Ltd.—Radio receiving circuits. 12th August, 1949. (659598.)

21631. Communication Engineering Pty., Ltd.—Selection circuits. 19th August, 1949. (659601.)

22423. Decca Record Co., Ltd., Tanner, S. R., and Wiersma, R. A.—Pulse radar apparatus. 19th July, 1950. (659685.)

22956. Beswick, K. E., and Beswick, D. G. E.—Electrical fuses. 16th November, 1949. (659689.)

23311/23420. Dow Chemical Co.—Primary electric cells. 8th September, 1949. (659367/8.)

23726. Bendix Aviation Corporation.—Electrical regulating systems. 14th September, 1949. (659369.)

24163. Westinghouse Electric International Co.—Dielectric heating. 20th September, 1949. (659552.)

25123. Electrolux, Ltd.—Refrigerator cabinets cooled by means of absorption refrigerating apparatus. 30th September, 1949. (659700.)

25475. J. & E. Hall, Ltd.—Refrigeration plant. 4th October, 1949. (659375.)

25511. Cinch Manufacturing Corporation.—Contacts for holders for thermionic valves, plugs or like electrical devices having projecting prongs. 4th October, 1949. (659703.)

25695. Johnsson, G. R.—Magazine cigarette cases having electric lighting means. 6th October, 1949. (659557.)

25899. Fairweather, W. C. (Singer Manufacturing Co.). —Electrically controlled stop-motion system. 8th October, 1949. (659558.)

26445. British Thomson-Houston Co., Ltd.—Electronic relay arrangements for protecting power systems. 14th October, 1949. (Cognate application 26446, 14th October, 1948.) (659610.)

27711. Svenska Turbinfabriks Aktiebolaget Ljungstrom.—Units comprising a gas turbine driving an electric generator. 28th October, 1949. (659714.)

27719. Akt.-Ges. Brown, Boveri & Cie.—Cooled gas turbine rotor. 28th October, 1949. (659715.)

27931. Landon, E. C.—Convertible electrically heated flat iron. 1st November, 1949. (659481.)

27947. Compagnie des Freins & Signaux Westinghouse. —Asymmetrically conductive elements. 1st November, 1949. (659482.)

27972. British Thomson-Houston Co., Ltd.—Resilient mountings for machines such as electric motors. 1st November, 1949. (659562.)

28482. British Thomson-Houston Co., Ltd.—Electric switches. 7th November, 1949. (659719.)

28601. British Thomson-Houston Co., Ltd.—Noise suppression circuits for radio receivers. 8th November, 1949. (659723.)

29345. British Thomson-Houston Co., Ltd.—Variable reactance devices. 16th November, 1949. (659726.)

29556. Westinghouse Electric International Co.—Lubrication systems for aviation power plants. 18th November, 1949. (659569.)

29684. Groux, C.—Fastening bar for electric conductors. 21st November, 1949. (Cognate application 29685, 18th February, 1949.) (659728.)

29714. Philips Electrical, Ltd.—Mechanical drives. 21st November, 1949. (659729.)

31993. Metropolitan-Vickers Electrical Co., Ltd.—Impulse generators. 13th December, 1949. (659388.)

31994. Maschinenfabrik Oerlikon.—Radial-flow blowers and compressors. 13th December, 1949. (659389.)

32119. Telefonaktiebolaget L. M. Ericsson.—Electric wire fasteners. 14th December, 1949. (Cognate application 32120, 30th September, 1949.) (659584.)

32219. British Thomson-Houston Co., Ltd.—End shield assemblies for dynamo-electric machines. 15th December, 1949. (659585.)

32261. Trico Products Corporation.—Pivotal supports for power lines in a motor vehicle. 15th December, 1949. (659587.)

33326. Union Switch & Signal Co.—Electric relays of the flasher type. 30th December, 1949. (659390.)

33483. Gyproc Products, Ltd., White, R. M., and Johnstone, A. B. A.—Mounting for use in the fitting of electrical switches, sockets and like electrical components to hollow or cavity walls. 22nd March, 1950. (659590.)

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

CONTRACTS OPEN

Where "Contracts Open" are advertised in our "Official Notices" section, the date of the issue is given in parentheses.

Australia.—BRISBANE.—9th November. City Council. Underground and pilot cable and jointing material. (C.R.E. (I.B.) 69490/51. Ten/2905.)*

MELBOURNE.—10th October. State Electricity Commission of Victoria. Supply of twenty 1,100 V d.c. high-speed air circuit breakers. (C.R.E. (I.B.) 70211/51. Ten/2927.)*

Belgium.—BRUSSELS.—28th November. State Railways. Twenty double bogie electric locomotives. (C.R.E. (I.B.) 69741/51. Ten/2909.)*

Egypt.—CAIRO.—6th November. Director-General, Cairo Electricity and Gas Administration. 63 kV underground cable system and associated transformer and switching stations. (See 7th September issue.)

India.—DELHI.—India Store Department. Supply of 160 tons of copper conductor wire. (See this issue.)

MADRAS.—22nd October. Government of Mysore Stores Purchase Committee. L.v. switchgear for Mysore Forbes transformer station. (C.R.E. (I.B.) 69156/51. Ten/2889.)*

Salburn.—8th October. U.D.C. Street lighting equipment. (See this issue.)

Slough.—1st October. Corporation. Street lighting equipment. (See this issue.)

ORDERS PLACED

Glasgow.—Education Committee. Installation of electric lighting, bells, clocks, fire alarms, etc., at Priesthill Crescent Primary School (£4,733).—Corporation Central Electrical Workshops.

Manchester.—Housing Committee. Electrical installations in 45 aged persons' dwellings.—F. W. Cole & Sons. Installation work in 30 flats and 80 houses at Newall Green, and 72 flats at Woodhouse Park.—A. E. Sudlow & Co., Ltd.

March.—U.D.C. Wiring of 42 houses at Peashill estate (£1,124).—Eastern Electricity Board.

Newcastle-under-Lyme.—General Purposes Committee. Electrical installation work at Hempstalls Farm C.P. School (£2,214).—J. Bagguley & Son.

Highways Committee. Installation of street lighting on various Council housing estates (£7,429).—B.T.H. Co.

*Specifications may be inspected at the Commercial Relations and Exports Department, Board of Trade, Thames House North, Millbank, S.W.1 (Victoria 9040).

Newcastle-on-Tyne.—Electrical installation in new offices in Market Street, for the Halifax Building Society.—Devereux Moodie & Co., Ltd.

Peterborough.—Highways Committee. Electrical installation at the new sewage purification works (£3,600).—City Electrical Co., Ltd.

Smethwick.—Corporation Watch Committee. Installation of electricity in police substation, police houses and flat on the Windmill Lane site (£439).—Midlands Electricity Board.

Southport.—Corporation Lighting Committee. Provision and installation of street lamps:—Ninety "S.O. Fifty" type at Rufford Road, Bankfield Lane, Queen's Road and Birkdale Station Centre (£4,743) and 162 "S.S. Fifty-one" type in 30 streets (£6,059, plus £2,171 for demolition and replacement).—Metropolitan-Vickers. Twenty-one cut-off type street lamps in Station Road (£997).—G.E.C.

Truro.—City Council. Electrical installation at the Regent Theatre.—Strand Electric & Engineering Co., Ltd.

CONTRACTS IN PROSPECT

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Basildon.—Houses (112) for Development Corporation; Kent & Sussex Contractors, Ltd., 109, Station Road, Sidcup.

Factory for Nufloor, Ltd., 34, Lauriston Road, E.9; Charles S. Foster & Son, builders, Smarts Lane, Loughton.

Bexleyheath.—Model home for elderly people (£70,000); county architect, Springfield, Maidstone.

Bridgwater.—Additional factory; Somerset Wire Co., Ltd., Bristol Road.

Brighton.—Factory, Hollingbury; Skelton, Sleat & Co., Ltd., 26, Raymouth Road, S.E.16.

Bristol.—Rebuilding Masonic Hall, Park Street; A. J. Knott, architect, 28, Orchard Street, Bristol.

Garage, workshops, etc., Bedminster estate; Road Haulage Executive, Works Section, 50, Goswell Road, London, E.C.1.

Bury St. Edmunds.—Reconstruction of West Suffolk General Hospital; East Anglian Regional Hospital Board, 33, Parkside, Cambridge.

Caernarvonshire.—Primary school at Llanllechid; H. E. Williams, 42, Glanrafon, Bangor.

Cardiff.—Bathing pool, turkish and shower baths, laundry, café, etc., in connection with scheme for Central Baths (£300,000); city engineer, City Hall.

Dagenham.—Factory and offices; Megam Units, Ltd., 74, Clerkenwell Road, E.C.1.

Dartford.—Offices, stores, etc., Kent Road; G. J. Lofts, Ltd., Royal Oak Yard, Spital Street.

Dorking and Horley.—Houses (80), on sites at Horley, Newdigate, Leigh, Headley and Abinger Common; clerk to R.D.C., Brookmead, Station Road, Dorking.

Epsom.—Technical college and art school; J. Harrison, Surrey county architect, County Hall, Kingston-on-Thames.

Erith.—Houses (52), Matfield Road, Belvedere; J. H. Clayton, borough surveyor, Council Offices.

Gateshead.—Large bakery additions proposed for Gateshead & District Co-op. Bakeries, Ltd.; C.W.S. Building Dept., contractors, West Blandford Street, Newcastle-on-Tyne.

Houses (100), Wrekenton; Clerey & Sons, builders, Frederick Street, Sunderland.

Hastings.—Houses (98), Blacklands Farm estate, Hollington; borough surveyor, 37, Wellington Square.

Hazel Grove and Bramhall.—Houses (80), Bosden Fold site, for U.D.C.; F. Bradley, architect, 4, Wood Street, Bolton.

Hessle.—Junior and infants' schools, with kitchens, dining rooms, etc.; John & Crabtree, architects to East Riding E.C., 20, Priory Place, Doncaster.

Ketton (Stamford).—Cement factory on site at Dove Holes; Ketton Portland Cement Co., Ltd.

Leeds.—Colleges of art, commerce, technology and housecraft between Civic Hall, Fenton Street, and Woodhouse Lane; Yorke, Rosenberg & Mardall, architects, 2, Hyde Park Place, London, W.2.

Lingfield.—County primary school (£42,003) for Surrey E.C.; county architect, Kingston-on-Thames.

Liverpool.—Shop and office building at 58/66, Lime Street for Du Barry, Ltd.; Wm. Lowe & Partners, architects, 1/3, Eberle Street, Liverpool.

Dwellings (672), Kirkby estate; city architect.

Lleyn.—Houses at Tudweilog for R.D.C. (£14,745); W. N. Davies, Rhiw.

London.—Bethnal Green.—Flats (51), Lansdel Place; borough engineer.

St. Pancras.—Flats (46), Judd Street; D. C. Hall, architect, 6, Masons Yard, Duke Street, S.W.1.

Westminster.—Reconstruction after war damage of St. John's Church, Smith Square; R. Atkinson, architect, 13, Manchester Square, W.1.

Mansfield.—Erection of Stafford Street Primary School; H. Rouse & Sons, 30, High Street, Mansfield Woodhouse.

Matlock.—Bus station, Bakewell Road; U.D.C. surveyor.

Middlesbrough.—Bottling factory, Lower Gosford Street, for Winterschladen & Co., Ltd.; T. Crawford, architect, 80, Borough Road, Middlesbrough.

R.C. church, College Road, Thorntree; T. A. Crawford, architect, 80, Borough Road.

Radiotherapy subcentre at North Ormesby Hospital for Regional Hospital Board; N. Thompson, builder, Stonehouse Street.

Middleton.—Houses (58) and 30 flats at Hollin estate; borough surveyor.

Newbury.—Houses (78), Northfield Road, Thatcham; Francis Bros. (Builders), Ltd., 11, Armour Road, Tilehurst, Reading.

Oakham.—Maternity unit at Rutland Memorial Hospital; Webb & Gray, architects, Tixall House, St. James's Road, Dudley.

Oldbury.—Houses (92), Brandhall estate; Titford Property Co. (Langley), Ltd., Langley.

Oldham.—Houses (78) and old persons' bungalows (12); Cameron & Middleton, architects, 32, Deansgate, Manchester, 3.

Penrith.—Houses (50), Little Salkeld; U.D.C. surveyor.

Peterlee (Co. Durham).—Factory for Billetop & Gilpin, Ltd., bushings manufacturers, Victoria Road, Syston, Leicester.

Prescot.—Houses (56), Shaw Lane estate; F. A. Gregson, surveyor, Urban Council Offices.

Preston.—Houses (200) for workers at English Electric Co., Ltd.; borough engineer.

Ramsgate.—Houses (74), Newington estate; borough engineer.

Redcar.—Houses (110) on Lakes estate. Builders: Westfield Estates, Ltd., Redcar (12 houses); Theaker & Co., Ltd., Saltburn (24); Sykes Brothers, Redcar (28); Beavor & Sharp, Redcar (6); W. A. King & Sons, Ltd., Middlesbrough (30); and Hunt & Tose, Redcar (10).

Runcorn.—Flats (36), Town Hall estate; U.D.C. surveyor.

St. Austell.—Chemistry and biology laboratories at boys' grammar school; S. Gregson, architect, County Hall, Truro.

Salford.—Flats (33), corner of Devonshire Road/Eccles Old Road; city engineer, Town Hall, 3.

Sheffield.—Workshops, warehouses and offices, Furnace Hill; J. Newman & Son (Sheffield), Ltd., 91, West Bar.

Shrewsbury.—Central ambulance depot for Shropshire C.C.; A. G. Chant, architect, Column House, London Road.

Southend-on-Sea.—Temple Sutton Primary School, Eastern Avenue; borough architect, 30, Alexandra Street.

Stafford.—Block of flats, Rising Brook estate; borough surveyor.

Sunderland.—Large additions to Ryhope General Hospital for Newcastle-on-Tyne Hospital Board; Robert Hudson & Sons, Ltd., contractors, St. Mark's Crescent, Sunderland.

Widnes.—Cement works; Associated Portland Cement Manufacturers, Ltd., Portland House, Tothill Street, S.W.1.

Workington.—Houses (42), Laverock Hall estate, for Westfield Housing Association; J. Saul, architect, Workington.